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J. R. ANDERSON,
Deputy Minister of Agriculture.

SIXTH REPORT

OF THE

DEPARTMENT OF AGRICULTURE

OF THE PROVINCE OF

BRITISH COLUMBIA.

1900.

THE GOVERNMENT OF
THE PROVINCE OF BRITISH COLUMBIA

VICTORIA, B.C.:
Printed by RICHARD WOLFENDEN, Printer to the King's Most Excellent Majesty.
1901.

To His Honour the Honourable Sir Henri Gustave Joly de Lotbinière, K.C.M.G.,
Lieutenant-Governor of the Province of British Columbia.

May it please Your Honour:

The Sixth Report of the Department of Agriculture is herewith respectfully submitted.

J. H. TURNER,
Minister of Agriculture.

Department of Agriculture,
Victoria, B. C., 15th July, 1901.

VICINITY OF VICTORIA—OLYMPIAN RANGE IN DISTANCE.

SIXTH REPORT

—OF THE—

DEPARTMENT OF AGRICULTURE

—OF—

BRITISH COLUMBIA.

1900.

The Hon. J. H. Turner,
Minister of Agriculture, Victoria, B. C.

Sir,—Again, owing to unavoidable circumstances, no report has been issued since that of 1895-96. I am unable, also, to present statistical information regarding the agricultural products and interests, as no provision was made for their collection. I may here be permitted to say that the absence of these statistics, viewed from any standpoint, is to be deplored. The information which is naturally sought by the financial institutions of the country, as well as by many other classes of people, at the Department, is not to be obtained. The value of the agricultural interests is an unknown quantity, and comparisons as to their progress or otherwise are therefore impossible.

It can be safely asserted, however, that the production of agricultural products, owing to more enlightened methods, increased number of people engaged in farming, of land under cultivation, the erection of creameries, etc., has materially increased since the issue of the last report. In spite, however, of this accession in volume of products, it will be seen by the table of imports that there has been an enormous increase in the imports of agricultural products. This is explainable, no doubt, by the great accession to the mining population of the Province, the opening of new districts, such as Atlin, where practically nothing is produced, the increase in the lumbering, fishing and sealing industries, and, lastly, the opening of the Yukon country, the supplies for which are drawn principally from this Province.

The table of exports is quite incomplete, owing to the impossibility of obtaining statistical information on that head. Were they obtainable, they would, no doubt, account in a great measure for the increased imports of agricultural products, inasmuch as those to Yukon would be included.

Root crops suffered severely from the depredations of the cut-worms last season. The same cause affected the production of vegetables generally; even grasses and grain were affected, but not to the extent of soft, succulent plants.

By means of the Farmers' Institute system, a great deal of valuable, up-to-date information on farming problems has been promulgated throughout the Province, through the instrumentality of the able lecturers I have been able to secure, and the thousands of valuable books and pamphlets distributed amongst the members. A marked increase in the membership and interest in the system is apparent during the last year, due to the progressive and enlightened methods pursued, in contradistinction to the conditions previously imposed.

Further experience seems to accentuate the position I have maintained and expressed on the subject of Agricultural Associations, viz.: that a further increase of the numbers is not in the best interests of the country, and that, therefore, the Act under which they are formed should be repealed, and those now in existence allowed to continue under certain conditions. The holding of shows by those societies might, with profit, also be more under the supervision of the Department, especially as relates to the regulation of the dates and the arrangements for competent judges.

The production of cereals, with the one exception of oats, is not increasing throughout the Province. This is in line with the policy which has been steadily advocated by the Department for the farmers of the Lower Mainland and Islands. Experience has shown that land in these sections can be put to much more profitable uses. Wheat, it is true, is produced in considerable quantities in the Okanagan and Spallumcheen country, and in the vicinity of Shuswap; but even there, under the most favourable conditions for its production, many farmers are awakening to the fact that it is not always the most profitable line of agriculture.

Cigar tobacco is being produced in increased quantities at Kelowna, where the Kelowna Shippers' Union have a cigar factory in successful operation.

The orchards which have been set out during the last few years are gradually coming into bearing, with the result that the production of fruit is largely increased, and improved methods of picking, packing and shipping are forcing themselves on producers, in order to compete with their active competitors to the south.

In consequence of the low price of hops which prevailed for some years, some of the growers on the Lower Fraser abandoned their production. The better prices, however, which have since been obtained in England, have compensated those who held on. The largest production is at Lord Aberdeen's ranch, near Vernon.

Co-operative dairying is finding more and more favour with the farmers generally, and advantage is being taken of Government assistance in several localities for the erection of creameries. The product is, however, far short of the demand, and since the industry is certainly profitable, it is a matter of some curiosity why this branch is not developed more rapidly. One condensed milk factory is in operation; it is situated at Mission City, but results are not yet known.

The importations of pure-bred live stock from the Eastern Provinces, through the efforts of the Dairyman's and Live Stock Association, aided by the Government, have been most successful, and will result in great good to the herds of the Province, and profit, it is hoped, to the breeders in the East.

The production of horned cattle for beef is reported a profitable one in nearly every section of the country, whether produced in large herds on the extensive ranges of the upper country, or in the smaller numbers of stall-fed animals. The seasons of late have also been of such a favourable character that losses have been comparatively few, and feeding has been done at a minimum cost. Dairy cattle, in consequence of the increased interest in this branch, have of late acquired a value far in excess of that of former years.

Horses, from various causes—possibly the demand for military purposes being one of the concomitant reasons—have been much more profitable of late, and the industry has, in consequence, had a considerable impetus given it. Large draught horses are, on the whole, the most profitable.

Sheep are only produced in limited numbers, principally on Vancouver and the Gulf Islands. Whilst it is conceded by some that sheep would be more profitable than cattle on the large ranges of the interior, the concensus of opinions is against their introduction on the ranges. Another reason against the keeping of sheep on the ranges is the prevalence of coyotes and other beasts of prey. Wool may be said, under present conditions, to be worthless, and, therefore, sheep for mutton alone are bred.

The swine industry is capable of great expansion, and in proof of this one has only to look at the table of imports, where swine and their products, it will be seen, amount to the value of $945,960, or nearly a million of dollars. The expansion of the dairying industry, which is so intimately connected with the production of the pig, will no doubt have a great influence in increasing the production of this valuable article of food.

The production of poultry is probably one of the most remunerative branches of agricultural industry, and although not prosecuted on a large scale, there are many breeders of fine poultry in the Province who are reaping a good harvest from a comparatively small outlay. Mr. Blanchard, a successful poultryman of the State of Washington, says the conditions for profitable poultry production in this Province are unsurpassed in the North-West; an opinion which is shared by Mr. Gilbert, the poultry manager of the Central Experimental Farm. Moreover, Mr. Blanchard says that the breeding of many of the fowls is exceptionally good.

Soiling crops and ensilage, which in the past have been lamentably neglected, are now receiving that attention in many quarters which is due to them, and we may in the near future look to a great accession in these important branches for the successful feeding of dairy cows during the dry months of summer and in winter.

Irrigation of the arid regions of the dry belt, apart from individual efforts, has not been attempted on any large scale. There are many sections which, with co-operative effort and the proper conservation of water, can be made valuable additions to the fertile lands now cultivated. This is a question which is deserving of earnest consideration at the hands of the Government. The utilisation of the waters of the great rivers and lakes, now unavailable for use by natural gravitation, is also a problem to be solved in this connection.

Dyking of the rich delta lands of the Fraser has been and is being successfully pushed, and large tracts on both sides of the river are now kept free from water. There are many such areas which are as yet untouched, except in a very limited way, notably the delta lands of the Upper Columbia. The dyking operations of the lands of the Kootenay have, I am informed, been abandoned, for the present at any rate.

The raising of the bounty on coyotes to $2 per head is a move highly appreciated by those affected by these animals. As an additional incentive for their destruction, it is suggested by a correspondent that the bounty be placed at $2.25, to be paid on the whole skin, not mutilated by having the ears removed, and that the skins be sold by the Government, which in the unmutilated state, he avers, are worth $2.25 in New York, whilst mutilated they are only worth 25 cents. The bounty on panthers and wolves is considered sufficient, although the former are increasing in parts of the Mainland where formerly they were seldom seen. The wild horse question still remains unsolved, and huge bands of these worthless beasts still roam over some of the best ranges of the interior, doing incalculable damage, to the detriment of the cattle industry. The production of a good class of horses is also rendered abortive in many sections, owing to the scrub stallions which run with the bands of wild horses. A bounty on blue jays has been repeatedly asked for, these birds being represented as very harmful. The Government, not being convinced of the wisdom of such a course, has so far declined to interfere.

Plants poisonous to stock consist principally of water hemlock (*Cicuta sp.*). This plant has a very wide distribution and has proved fatal to cattle in many cases in the early spring, when, owing to the scarcity of green food, it is eaten by stock; and growing, as it does, in soft swampy land, it is easily pulled up by the roots, a very small quantity of which is sufficient to kill an animal. There are many other reputed poisonous plants, but I have been unable to trace any fatal results to any of them. A fatality amongst the horses of Mr. Neill Beaton, at Cherry Creek, engaged my attention, and during two visits which I made to his ranch I failed to discover any plant, except possibly poisonous mushrooms, which might have caused death; and although the symptoms resembled those of mushroom poisoning, it is questionable whether horses will eat them. Dr. McEachran, the Chief Dominion Veterinary Surgeon, avers that they are sometimes eaten by stock, and it is quite possible this may have been the cause. I have taken up this matter with the United States Department of Agriculture, and with the Dominion Botanist.

The Canadian thistle, which is the only weed against which there is any legislation, is, I regret to say, increasing, the provisions of the Act being of such a character that it is all but impossible to get people to carry them out. Other noxious weeds are in evidence, and I have been asked that several of them shall be included in a comprehensive Act.

Plum rot, I regret to say, is prevalent in the humid regions of the Lower Fraser; it is however, not in evidence either on the islands nor in the upper country of the Mainland. Vigorous measures are being adopted for the suppression of that and other diseases and pests by the Board of Horticulture, through the energetic member for the district, Mr. Thos. Cunningham.

The number of noxious insects which are the bane of the farmer and fruit grower, with, perhaps, the exception of the cabbage butterfly (*Pieris rapæ*), has not increased. The latter (an English pest, I believe) has, unfortunately, made its appearance in the Province. The San Jose scale and codling moth, thanks to the efficient administration of the Provincial Acts, have so far been kept out. Grasshoppers did a considerable amount of damage to crops in parts of the dry belt last year. Cut-worms of several varieties are always in evidence, but the sudden increase of one of the varieties, the larvæ of a moth called *Peridroma saucia*, amounted to a plague last year, not only in this Province but in the adjoining American States. The prompt measures which were adopted by the Department in sending out information, served to ameliorate the evil effects in a great measure, but much loss had occurred before the people realised the extent of the mischief. I am pleased to say that thus far there are no indications of abnormal numbers of these pests appearing this year.

Diseases of animals are not increasing. Tuberculosis is by no means general, although there are, of course, many isolated cases. The same may be said of glanders amongst horses and scab amongst sheep. Red water prevails on the Lower Fraser to some extent, where the cattle often feed on acrid plants of the low lands. Anthrax is reported on some of the ranges of the Okanagan, and the matter has been referred to the Chief Dominion Veterinarian.

Experiment Stations in different parts of the Province are constantly urged upon the attention of the Department. It is urged that the Dominion Government Station at Agassiz only answers for one part of the Province, which, owing to its topography, presents such a variety of climate and conditions. A small Experiment Station situated in the immediate neighbourhood of Victoria, so as to be under the immediate supervision of the officers of this Department, is certainly urgently needed for experiments with seeds and plants which are sent to the Department, and seeds of forest trees and fodders, and for the conduct of investigation relating to scientific purposes. The work of the Department is seriously hampered from lack of such advantages, and I would urge that steps be taken at an early date to secure sufficient land for the purpose.

The analyses of soils is another subject requiring most earnest attention. At the present time I have to depend upon the courtesy of the Dominion Chemist, at Ottawa. Inasmuch, however, as that gentleman's time is fully occupied with other matters, it is quite uncertain when, if at all, he can do the work and make a report on soils sent him.

Clearing land by the use of blasting powder is found to be the only efficient and least expensive way of getting rid of the stumps. The action of the Government in endeavouring to place explosives within the reach of the settlers at cost price is highly appreciated. Some modification of the conditions will, however, in my opinion, have to be made before the experiment will prove entirely successful.

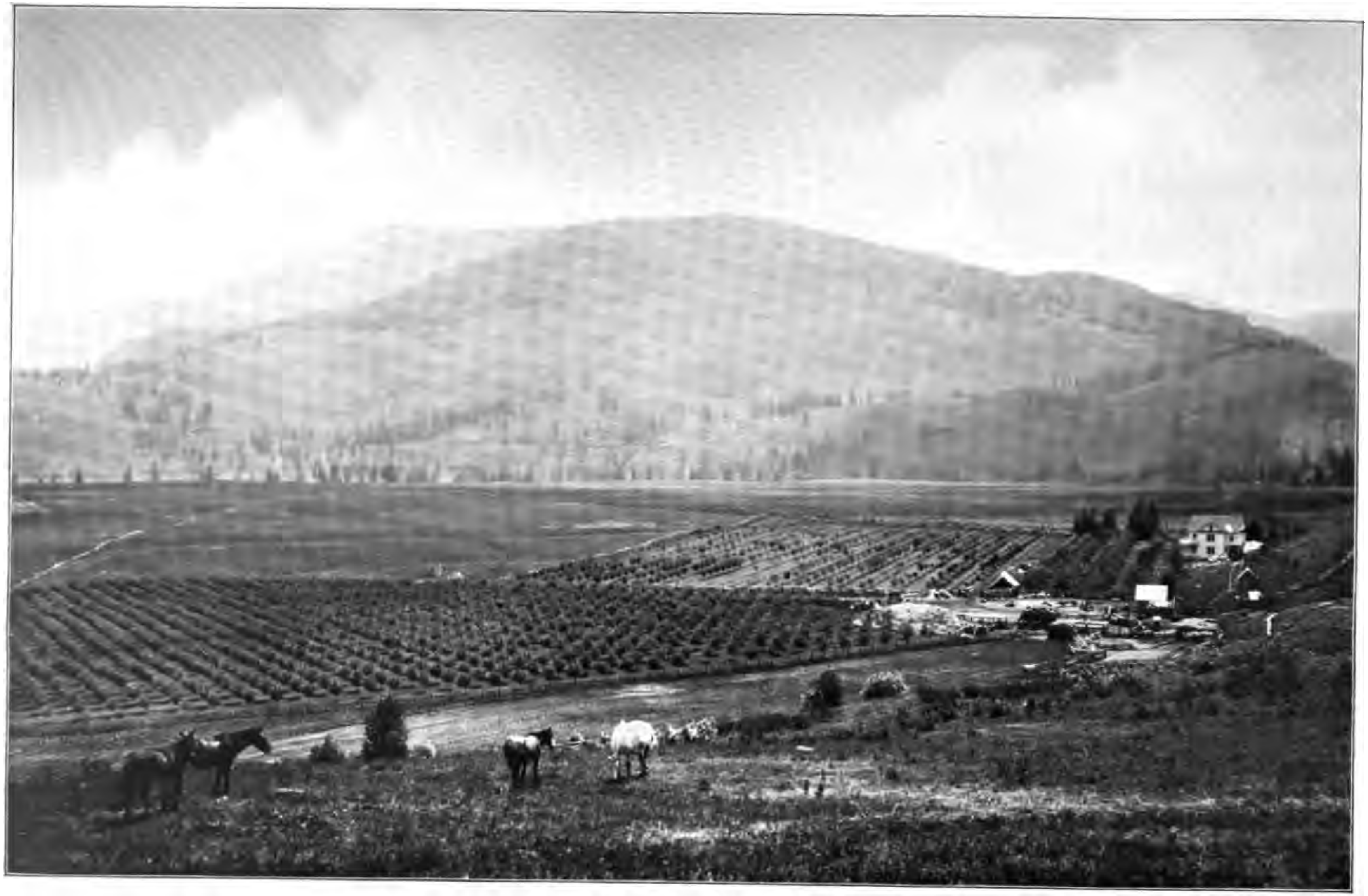
Forestry, so closely connected as it is with the farming industry, and forming one of the principal industries of the Province, has had all the attention bestowed upon it that it is possible to give with the limited means at my command. I deal with this subject in another portion of this report. Specimens of our native woods have been and are being collected for the museum of the Department, for sending away to other parts of the Dominion and other countries, and much information as to the economic value of our woods, distribution and extent, has been collected and preserved for future use.

Some fifteen hundred herbarium specimens, representative of the botany of the Province, have been collected by my almost unaided efforts and placed in the museum of the Department. These specimens, although not by any means representing the whole number of our plants, nevertheless form the nucleus of what in time will prove a most valuable adjunct to the Department.

Specimens of grains, grasses, fodder plants and fruits are also being continually added to the collection in the museum, and made for the purposes mentioned elsewhere.

I have attended a great many meetings of Farmers' Institutes and others in the Province, and some in other places. At a meeting of the North-West Fruit Growers' Association held in Portland, last February, I was the recipient, as representative of the Province, of much attention at the hands of the officials; I also at that time took the opportunity of visiting the Agricultural Colleges of Oregon, Washington and Idaho, with a view of studying their methods and ascertaining the terms on which our young people would be admitted. These I found to be most liberal, and the system of education most excellent.

The work of the Department has steadily increased, so that temporary assistance has been found to be absolutely necessary to keep it from falling behindhand. An additional permanent man, when one can be obtained, combining the requisite qualities which are essen-



FRUIT FARM, GRAND FORKS.

tial in this Department, should be added to the staff, in order that the constantly increasing duties involving upon me shall not accumulate during my absences on duty connected with the Department.

The topography and climatic conditions seem to lend themselves to a natural division of the Province into three distinct divisions. I have, therefore, followed the practice of former years in describing the country, of dividing it as follows, viz.:—

THE UPPER MAINLAND—Being all that portion to the eastward of the Coast Range of mountains, and including within its limits the large cattle ranges and what is known, owing to the small precipitation, as the Dry Belt.

THE LOWER MAINLAND—Being all that portion on the sea coast to the westward of the Coast Range, and including within its boundaries the rich delta lands of the Fraser. This part of the country is generally heavily wooded with forests of magnificent timber, and is the most humid portion of the Province.

THE ISLANDS—Being all that portion including Vancouver Island and the islands adjacent thereto. This portion of the Province partakes somewhat of the characteristics of the two other divisions, and resembles the first part in the distribution of the flora and its lessened precipitation.

My thanks are due to Dr. Saunders, Director; Dr. Fletcher, Entomologist and Botanist; Prof. Shutt, Chemist; and Mr. Gilbert, Poultry Manager of the Central Experimental Farm: to Prof. J. W. Robertson, Dominion Agricultural Commissioner; Mr. F. W. Hodson, Dominion Live Stock Commissioner; the Directors and Professors of the Agricultural Colleges of the adjoining States; Mr. H. L. Blanchard, of Washington; the Rev. G. W. Taylor, Wellington; the members of the Board of Horticulture; the various Secretaries of Farmers' Institutes and correspondents of the Department, who have given me such material aid in connection with the work of the Department, and in producing the following report, which is submitted for your approval.

I have the honour to be,
Sir,
Your obedient servant,

J. R. ANDERSON,

Deputy Minister of Agriculture.

Department of Agriculture,
Victoria, B. C., July 15th, 1901.

UPPER MAINLAND.

——o——

Boundary.

In which is included Grand Forks, Midway, Rock Creek, Sidley and Osoyoos.

Rainfall at Midway, 1900	10.35 inches.
Snowfall 〃 〃	18.01 〃
Lowest temperature, 〃	-22.0°
Highest 〃 〃	100.5°

Mr. E. Spraggett, correspondent at Grand Forks, reports as follows:—

GENERAL DESCRIPTION.

The Boundary District forms the extreme southern part of the District of Yale. In it are four distinct mineral basins: that around Christina Lake on the east, that adjacent to the north fork of Kettle River, of Boundary Creek, and that of the main Kettle River, with Rock Creek and other tributaries. The whole area covers a distance of about forty miles east and west, and extends about fifty miles northwards. The southern boundary is the international frontier.

The topography of the district, while it offers a considerable diversity, is not very different from that of all the great interior plateau of British Columbia. Whilst mountainous, its highest points seldom exceed 5,000 feet, Kettle River being about 1,700 feet above sea level. Most of the hills are forested to their very summits with a variety of coniferous trees. The eastern, southern and western slopes are open, and afford a prolific growth of bunch-grass, and along the valleys are many ranches which are especially adapted to diversified farming, with the aid of irrigation. There have been numerous finds of ore in all these basins, but a great deal of unexplored land is still open to the prospector. The ore bodies, famous for their enormous width, carry values in gold and copper, and gold, copper and silver. To a large extent—in some properties, perhaps entirely so—the gold will pay the mining and smelting charges, leaving the copper partly or wholly net profit. There is, of course, some silver produced, but its position is secondary.

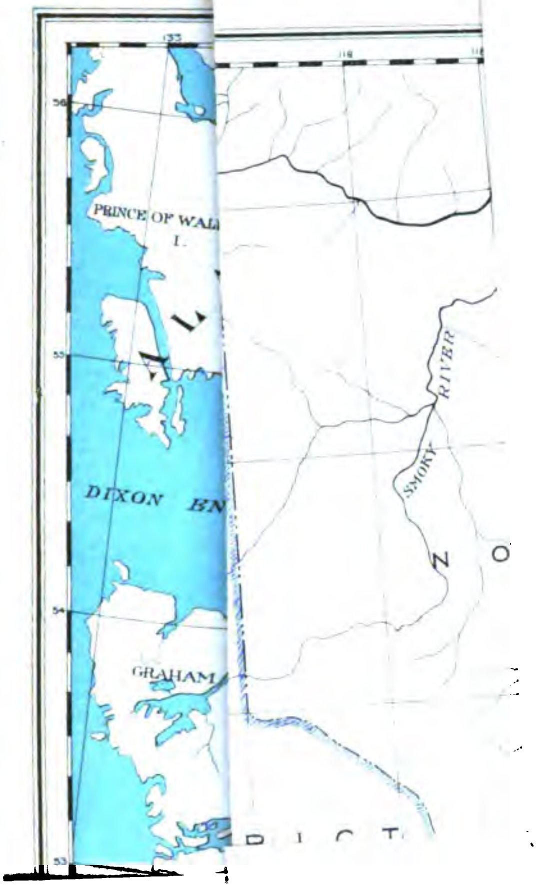
The climate is an ideal one, with no extremes of heat or cold. The snowfall in the valley is light. Spring opens early. The summers are pleasant and not excessively hot, the temperature always declining at sundown. The Boundary is famous for its bracing atmosphere, and has been described by Dr. Bryce in his "Climates of Canada" as the ideal national sanitarium.

The mining camps tributary to Grand Forks, and with which they are connected by good roads and by rail (partially), are Central, Greenwood, Wellington, Hardy Mountain and Summit. This is exclusive of Brown's, Knight's, and other camps dotting the north fork of Kettle River. Fifty miles north of Grand Forks is a mineral belt discovered a year ago. It already boasts two camps—Franklin and Gloucester—where rich copper-gold ore is being taken out.

The supplies for these places are purchased in Grand Forks. The aggregate volume of this trade is estimated at upwards of $500,000 annually, and is constantly increasing. And yet the development of the hidden wealth in this rich territory is only in its infancy.

Grand Forks, the mining, smelting and commercial centre of the Boundary country, is situated in a fertile and picturesque valley at the junction of the main Kettle River and the north fork of Kettle River. It is an important station on the Columbia & Western railway (C. P. R. extension). It is likely that Grand Forks will be connected by rail next summer with Republic, the well-known mining camp on the Colville Reservation, in the State of Washington. The distance between the two points is thirty-five miles.

Five or six years ago Grand Forks was a nameless ford; to-day it possesses a population exceeding 2,000. No other point in Southern British Columbia offers superior advantages for business men, real estate investments, or as a place of residence. The educational facilities are exceptional, and nearly every religious denomination is represented by a church.



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Grand Forks is situated in the centre of an extensive valley, the extreme length of which (in Canada) is not less than twenty miles, and the average width three and one-half miles. This represents an area of over 45,000 acres of splendid loamy soil, admirably adapted for general farming and fruit raising. Apples, peaches, pears, plums and prunes here attain perfection. The small fruits also thrive, strawberries bearing the first season. The apples grown in the valley captured the highest awards at the Spokane Fruit Fair. An exhibit was sent to the recent World's Fair at Paris, France. Vegetables also yield prolific crops. Small fruit and vegetable farms derive large profits, as proximity to an increasing market gives the producer an advantage over outside competitors who have to pay railway freights. The only greenhouse in existence reports handsome returns. Of late there has been a tendency to cut up farms into tracts of twenty or thirty acres each, to be devoted to fruit and vegetable raising. The prices for cleared lands, near Grand Forks, average about $50 per acre. A good crop can be raised the first season. One general farmer had a crop this past season that yielded a total income of about $10,000. The major portion of the revenue was derived from the sale of fruits. There is an unlimited demand for all these products in the Boundary country, and this is especially so of the various mining camps.

Throughout the district there is a good supply of timber, such as pine, fir, cedar and tamarack, and this stretches all the way up to the headwaters of the north fork, assuring an unlimited supply for years to come. In this neighbourhood are superior clay beds for the making of brick and tiles, besides lime and building stone quarries.

GRAINS.—Only oats are produced to any extent; ruling price, $30 per ton.

ROOTS.—Potatoes are raised in considerable quantities; ruling price, $20 per ton. Other root crops and vegetables in limited quantities.

GRASSES.—Timothy is grown for hay; fetches $25 per ton. Wild grasses grow luxuriantly on the hills, and give excellent pasture for animals.

FRUITS.—Fruits of all kinds produce fine crops of excellent quality, apples and prunes particularly.

LABOURERS.—Whites, $2.50 per day.

The following information is furnished by Mr. R. Sidley, correspondent, Sidley:—

This is an agricultural settlement situated on the mountain between Osoyoos Lake and Rock Creek. The altitude (3,500 feet) is too high to be an ideal farming region, but the rich soil and the high prices obtained for what is raised have made the settlers prosperous and contented. The land is fairly level, being park-like in appearance, and a horse can be ridden all through the timber. The open land has been all taken up, but there is a large quantity of timbered Government lands still vacant. The air is very dry and bracing, and sickness is unknown. Water is very pure and cold. The C. P. R. has a line to the coast surveyed through it. There are no roads, except through the United States. There are no mosquitoes or rattlesnakes. The market is the various mining camps around. There are two schools, a customs house, and mails three times a week. Population, 300.

WHEAT is not a success, owing to the high altitude; besides, as all grain raised here commands from 1½ to 3 cents a pound, it is far cheaper to buy flour.

OATS.—No particular variety grown. Average yield was 40 bushes per acre last year; the summer was too cold for a good yield. No pests or diseases. There is hardly anything else raised but oats. Average price was 2 cents per pound on the ranch.

BARLEY.—Beardless and common is produced; average yield, 30 bushels. No pests or diseases. Only raised to fatten hogs, and the average price is 1½ cents per pound.

PEAS.—Garden varieties do well, but the weather is too dry and cold for the production of field peas.

POTATOES.—Produce about 200 bushels to the acre. No diseases. One and a half cents per pound was the ruling price.

VEGETABLES do well, but are only produced for home use.

GRASSES AND CLOVER.—Clover does not do well, the summer being too dry. Timothy does well. I know of no grass that will supersede it, but for cattle, especially calves, I myself, however, prefer Perennial (or English) rye grass. For wet land, red top is best. Timothy produces 1 ton to the acre, and the price was $20 per ton on the ranch. A patch of five acres that was manured yielded 12 tons. Austrian brome grass has succeeded well with one person who tried it. Native grasses make the best of pasture, and are often cut for hay.

FRUIT.—Apples and other large fruits are being experimented with; small fruits do well, but owing to want of transportation facilities, are not produced except for home use.

DAIRYING is very profitable. There is no cheese manufactured. Owing to the good quality of the grasses, the quality of the butter is of the finest, and brings 30 to 35 cents per pound. There is no creamery, there being not more than 150 cows available. Oats cut green is the best summer food for dairy cows. The production of horned cattle is a successful industry. Prices of milch cows run from $35 to $60, and beef cattle 8 cents per pound dressed. Shorthorns are recommended.

HORSES have not been profitable, owing to over-production. A Norman sire on cayuse mares makes a good cross. Saddle ponies are worth from $15 to $50.

SHEEP.—This is a suitable district for their production, but owing to wild animals (coyotes), they cannot be produced except on a large scale, so that it would pay to herd them.

SWINE raising is not prosecuted. Pigs, on foot, 7 to 8 cents. Bacon and hams, 14 to 16 cents by the pound. Berkshire is the most prolific and hardy. It is not advisable to let swine eat down grain; it is most wasteful.

POULTRY production is not prosecuted, although it is very profitable, as prices are high. For general purposes, Plymouth Rock; for eggs, the Brown Leghorn. Eggs, 25 cents to 40 cents per dozen. Spring chickens, $5 to $9 a dozen. The reason it is not followed more is that, without constant and assiduous attention, the poultry, if any number, will not do well; their destructiveness and the prevalence of coyotes.

As regards co-operation, my opinion is that farmers, as a rule, work too hard to take time to think. The trouble is that every one who has ever seen even a potato grow thinks he knows how to farm, whereas it takes more knowledge than any other occupation.

Experiment Stations are the only true solution of agricultural progress. The different conduct of the same seeds and plants under different climates and altitudes makes a large number of small experimental stations necessary. The ultimate gain to the country would be enormous. Agricultural education should form a part of the daily teaching in the public schools.

The soil hereabouts is deficient in lime, but that could easily be supplied, as limestone exists in the neighbourhood in large quantities; also deposits of marl. Not much clearing required, but some surface draining. I have found that putting two poles on each side of the bottom of the drain and then covering with split shakes, and on these put the sod taken out and then fill up, to be the best and cheapest. Irrigation is not required for grain, but is very profitable for roots and grasses.

As regards pecuniary assistance, there is no better or safer way of lending money, but much judgment must be used, as there are as many hair-brained farmers as are found in any class.

Of timber the following are plentiful and of merchantable size, viz.: Tamarack (larch—*Larix occidentatis*), bull pine (yellow pine—*Pinus ponderosa*), fir (Douglas fir—*Pseudotsuga Douglasii*); also spruce, alder, cottonwood, birch, etc.

There are no noxious weeds, plants, or insects, except the small house-fly for about six weeks in summer. Noxious animals are wild cats and wild horses.

The bounty on coyotes should be at least $2, as the hide is worth next to nothing. Wolves and panthers do but little damage, as they stay in the unsettled parts. The wild horse nuisance will soon settle itself. For instance, I have made a bargain with the Indians for one hundred head at $3, intending to kill them for pig feed. (Coyote bounty since raised to $2.—J. R. A.)

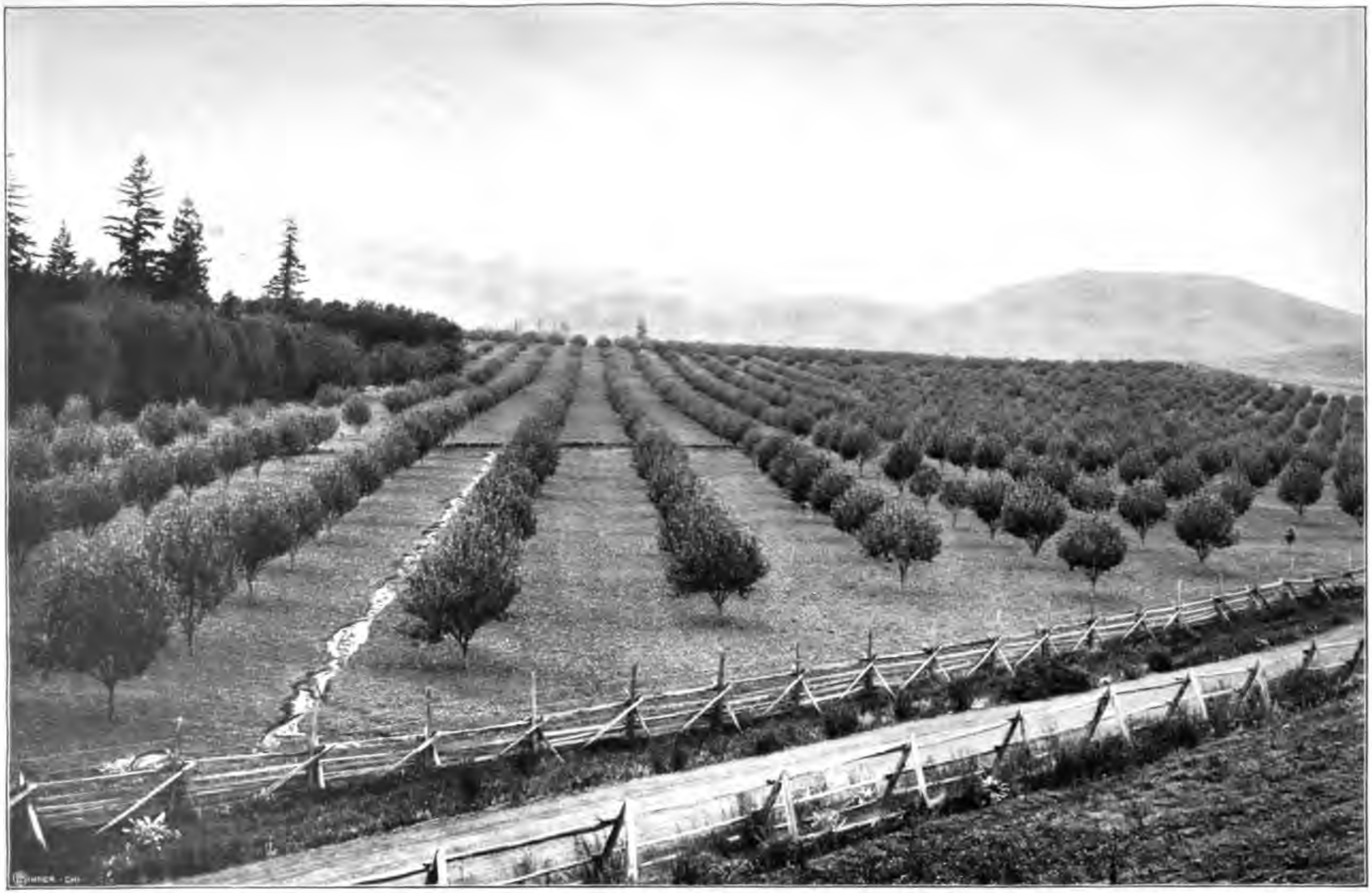
Forest fires hardly ever occur by intention; sometimes by accident, and mostly always by carelessness.

There is some Government land for pre-emption, but it is mostly all timbered, with open spaces between the belts of timber. There is a strip along the International Boundary Line of about 6 miles east and west, and 4 to 10 miles, north, betweeen Osoyoos and here, all of which is a beautiful summer range for cattle, and which will all be taken up before long. A horse can be ridden all through this, and it is well adapted for dairying.

Farms are not for sale, as the settlers are all doing well.

LABOUR.—Whites, $1.50 per diem; mechanics, $3. Chinese, Japanese, and Indians (mostly as stockmen), $1.

There is a preponderance of men who do not know that they know very little. Good farming men are very scarce.



APPLE ORCHARD, COLDSTREAM RANCH.

Similkameen,

In which I include White Lake, Keremeos, Princeton, Granite Creek and Otter Creek.

White Lake is situated on an elevated plateau on the road between Keremeos and Penticton. The country is open, with patches of brush along the water-courses and depressions, which are easily cleared. The land is of excellent quality, and yields all the usual crops. Mr. Hiram Inglee, correspondent, has a fine ranch here.

Keremeos is a settlement in the valley of the Similkameen River, considerably below the altitude of White Lake; probably about 1,000 feet above the level of the sea, White Lake being possibly 500 or 600 feet higher. A good waggon road, leading to Osoyoos, the mines in the Boundary country and Penticton, is the only means of communication at the present time.

Princeton is about 40 miles higher up the Similkameen River than Keremeos, in a northwesterly direction, at the confluence of Granite Creek, into which Otter Creek empties some 12 miles above. It is reached by a trail from Keremeos and Hope, and by a waggon road from Nicola.

Owing to lack of transportation facilities, many things that can be produced at Keremeos, and in the valley of the Similkameen generally, to the greatest perfection and in large quantities, are now quite neglected.

Mr. E. Bullock-Webster, in his last report, says of this section:—

Very little grain grown in the valley; cheaper to buy flour than to raise wheat. Roots and vegetables reach perfection on the rich, black lands of the valley; carrots, onions and parsnips do well on the sandy benches. Red clover and timothy are the chief hay grasses. Indian corn grows well, but is not used for forage. The valley is, above everything, a fruit country, and will in time be the first in British Columbia. The benches are entirely free from summer frosts. Apples, pears, plums, apricots, cherries, peaches, strawberries, and all small fruits—with irrigation—are a grand crop and of good flavour. Grapes are not planted as they should be; in fact, very little attention has been paid to fruit. At present the valley is entirely devoted to cattle raising in a rough and ready way; but in the future, when better methods are adopted, the valley should produce a large amount of butter. Portions of the hillsides and mountains are very steep, but the tops are covered with bunch-grass and winter grass; the bottom is rye grass, which stands up through the snow and makes good winter forage.

Hiram Inglee, correspondent, White Lake, reports as follows:—

CEREALS, except oats, are not produced to any extent. Roots are grown, but, except potatoes, not largely.

GRASSES.—Timothy chiefly grown; a good hay for horses and for nothing else. A few acres of alfalfa, put in two years ago, has not done well; altitude too high; sanfoin did better. *Bromus inermis* can't be beaten; it is a fine grass. There is a wild grass here, an undoubted Brome, very much like *B. inermis*, fairly plentiful.

INDIAN CORN grows well here, but does not ripen.

APPLES are successful. There was a good yield of good apples in the two local orchards. Green aphis present; spraying this spring with tobacco, soap and coal oil. Price, 3 cents per pound.

OTHER FRUITS.—Plums give splendid yields of good quality. Peaches also do well. Small fruits of exceptional quality.

HORNED CATTLE.—A profitable industry, the ranges being exceptionally good.

SHEEP would certainly pay well if the bounty on coyotes were high enough to keep them down somewhat, and for that reason none are kept. Very suitable country, however, except for winter feed, which would have to be provided in the neighbouring valleys.

Irrigation must be resorted to on the bench lands to ensure good crops, but there is not much easily available water for the purpose.

TIMBER.—No valuable timber. Small Douglas fir and red pine. Chiefly bunch-grass ranges.

POISONOUS PLANTS.—Poison ivy, larkspur and wild parsnip plentiful. I have attributed the loss of cattle to poisoning.

NOXIOUS ANIMALS AND ANIMAL PESTS.—Panthers are not so numerous as to make $7.50 too much, considering the harm they do. Wolves are only doing harm to deer at present.

[illegible]

Okanagan Lake

[illegible]

[illegible]

[illegible] Okanagan [illegible] Okanagan [illegible] Okanagan [illegible] running region. [illegible] excellent [illegible]

[illegible] reports as follows —

[illegible] per ton. [illegible] per ton. A good deal of [illegible] per [illegible]

[illegible] per ton. [illegible] grows well here, and [illegible] are good for [illegible]

[illegible] grows to the height of 14 feet, but does not [illegible]

[illegible] and fetch about 75c. per box. Plums and [illegible] escape early frost.

[illegible] with local trade, but lack of facilities [illegible] co-operative creameries.

[illegible] for alkali soils, but freight rates prohibit its use. [illegible] for about $4 per ton, but rates are about $25 per ton. [illegible]

[illegible] production of crops, and it is carried on to a [illegible]

[illegible] purposes, but more land would be used if a long distance of [illegible]

Cut-worms were worst about May 24. Got rid of by leaving land bare for two weeks and scattering poisoned bran broadcast. One tobacco grower spent $50 in getting the paper bands and placing round plants, as advised in Government reports, but the cut-worms crawled into them.

All Government land that is any good is pre-empted; nothing but wild range land left. Improved farms sell for from $20 to $100 and $200 per acre.

Mr. W. Smythe Parker, correspondent, Penticton, makes the following report:—

GENERAL DESCRIPTION.

Penticton, at the outlet of the Okanagan Lake, is the terminus of the roads leading from the Similkameen, Osoyoos, Kettle River, and all the numerous mining camps in the vicinity of those places. Nickel Plate Camp and Princeton will, ere long, prove to possess immense mineral wealth, and, with the present opening up of waggon roads and railways, will have good markets close at hand for all farming products. One important matter is at once needed, and that is: that these districts should be at once surveyed and new maps printed, so that settlers can take up the large tracts of land suitable for mixed farming. Water can be put upon these lands for irrigation purposes, and the Provincial Government ought to do it, charging a few cents per acre, and in thoroughly surveying these districts the one expense can be easily reduced and, eventually, profitable returns secured for the Provincial Government's outlay. The soils within these districts are extremely rich where water can be obtained, and grow almost anything. It is also the end of navigation; climate unsurpassed; scenery grand; and is also a health resort. There is abundance of fish and game. Fruit growing will surpass anything in British Columbia if attention is bestowed upon it. Stock raising is at present the principal industry, and it is a pleasure to look at those large herds of cattle, so fat and well bred for beef purposes. The same rewards await all industrious and enterprising settlers for mixed farming, etc. Here, for younger settlers, the future is a grand and sure one for profitable returns of capital, with energy, enterprise and labour.

I should consider that there are upwards of 200 people engaged altogether in ranching, fruit growing and mixed farming. Many came in upon the Nickel Plate Road construction last year, and are still coming in.

WHEAT can be well grown in these districts, and as soon as the lands are properly surveyed and well opened up, numerous settlers will come in. Milling will be the next important consideration, and then there will be more profitable returns for each settler, and other industries will follow. Ruling price, $25 to $30 per ton. A considerable quantity of oats is grown for feed; yield, 30 to 40 bushels per acre. Other cereals are grown in small quantities, and all succeed well.

GRASSES and clovers come to perfection, and, with water, yield double crops.

INDIAN CORN succeeds well.

APPLES.—Both early summer fruit and dessert, of the choicest varieties, grown successfully, and winter ones also. Price, 3c. to 5c. per pound; and generally free, to a certain extent, with care, from diseases and pests. All other fruits succeed well, particularly peaches.

HORNED CATTLE AND SHEEP.—No doubt small bands of sheep will prove a success when more settlers get their pre-emptions fenced in, and more suitable feed growing. The ranges are getting yearly of less value. The native grasses are fed out, and it needs a better state of farming to renew them; otherwise the ranch stock will yearly suffer and less profit attend it, with double the expense.

AGRICULTURAL EDUCATION.—The Province needs a public school for the purpose of thoroughly teaching the young how to work. To make a success of farming, young men must be trained for the career, the same as for any other business.

Report of Alex. McLennan, correspondent, west side Okanagan Lake, opposite Kelowna:

This section of the country is badly broken up. What agricultural land there is of any account is held by Indians. There are two reserves within three miles of each other, with about 20 Indians, all told, on both of them. They cultivate altogether about 20 acres, and this part of the district will never amount to much till those reserves are opened up for settlement. There are, I suppose, between 200 and 300 acres under cultivation by whites, mostly in small patches. Nearly any part of it is well adapted for fruit or grain and vegetables.

There are 15 pre-emptions taken up, and the population, all told, big and small, 73 white.

CEREALS.—Wheat is not grown for milling purposes; some oats are grown, but not to any extent.

POTATOES.—All kinds of popatoes are grown very successfully. Potatoes suffered last season from army worm and grasshoppers, and the yield was not up to the average. The yield would be about 5 tons to the acre. Varieties which appear to give the best satisfaction are: Early Rose, Peerless, Satisfaction, and Carman Nos. 1 and 3. Price, about $8 per ton; number of acres under potatoes, about 50.

GRASSES AND CLOVERS.—The principal grasses are timothy and red clover. Timothy would go from one and one-half to two tons per acre; clover would about double that, or from three to four tons per acre. Price in the fall was $10 per ton, delivered at C. P. R. wharf. Baled timothy sells here better here than any other kind of hay, but for stock I would rather have any kind of clover hay. Number of acres under hay would be about 100.

INDIAN CORN.—I have grown Angel of Midnight and Yellow Dent successfully.

FRUITS.—I don't know of any variety of apples that don't grow well here. I have tried fourteen different varieties, and all of them have done well. The yield in 1900 was extra good; the crop ripened at least two weeks earlier than usual. I would give 500 trees as an approximate estimate. The worst pest is green aphis. The remedies are Bordeaux mixture in winter, quassia chips and whale oil soap in summer. Ruling price was about $1.50 per 100 pounds.

Principally Bartlett pears are produced, and succeed well.

Plums and prunes do well. There are not a great many of them planted. Lombard, Green Gage and Yellow Egg all do well.

Small fruits do well. Currants, gooseberries, strawberries and raspberries are grown in abundance, with very labour. Prices, currants 2 cents per pound; raspberries, from 10 to 12 cents; and strawberries from 10 to 15 cents.

HORSES.—The supply of horses here has been greater than the demand for some time, and farmers have quit raising them, because they could not sell them at any price; consequently, horses are getting scarce, and after a while I believe there will be a good demand for them.

SHEEP.—This would be a fine sheep country if it were not for coyotes; but for that reason there are no sheep.

Co-operation is not thought of, but is a crying necessity.

Experimental stations, in my opinion, are very useful, and the only fault I find is that there are not enough of them. As the climate and soil is so much different in each section of British Colunbia, the experimental station is only useful in its own particular locality.

FARMERS' INSTITUTES.—If the farmers would take the interest in them that they should, I think they would be a great help to them.

Irrigation is required here everywhere, and land is of no use without it. There is quite a lot of land that could be cultivated if water could be got on to it. Water could be got too, but the cost would be too great for any one man to undertake it. The ordinary cost of an irrigating ditch would be about $50 per mile.

PECUNIARY ASSISTANCE.—I think the proper thing for the Government to do would be to assist farmers who are taking up new land, and have nothing to put into it but their labour. It would not only help the farmer, but the Government as well, and the country. I don't see any difficulty in finding a scheme that would protect the Government. They could lend money on the same principal as other loan companies, except that the Government lend with the object of helping, instead of getting everything the settler has got.

TIMBER.—The principal timber trees in this section are pine and fir, with cottonwood growing on low land. Timber is very easily got, and useful for lumber.

NOXIOUS ANIMALS AND ANIMAL PESTS.—I consider coyotes the worst pest that we have of the animal kind, and they are increasing very fast. I think the bounty on them should be not less than $2.50, for if they are not looked after soon they will get so numerous that it will give lots of trouble to get rid of them.

Cut-worms were very bad last spring. Crops most affected here were cabbage and tomatoes. The cut-worms appear as soon as the ground gets warm.

FOREST FIRES.—My opinion about forest fires is that nearly all of them are started from pure carelessness.

LAND.—There is Government land to be had here, dry bench land. I don't know of any improved land for sale.

LABOUR.—Whites, plenty; wages from $20 to $40 per month. Chinese, plenty; wages from $15 to $25. Japanese, not many yet. Indians, plenty; wages about the same as Chinese.

OKANAGAN LAKE.

Okanagan.

Under this I include the Commonage, White and Creighton Valleys, Mabel and Sugar Lakes, Priest Valley and Spallumcheen. This section may fairly be called the garden of the Upper Country, embracing as it does such a large and varied area of territory adapted to all conditions of husbandry and to the production of anything that can be expected to be grown in these latitudes. A branch line of the Canadian Pacific Railway runs through the district, connecting it with the main line at Sicamous. The principal town is Vernon, beautifully situated at the head of Okanagan Lake, and whence good waggon roads radiate to all parts of the district. Steamers connect it also with all points on the lake. Armstrong and Enderby are two other towns on the line of railway north of Vernon—fourteen and twenty-three miles, respectively. Each of these places have flour and saw mills, the flour mill at Armstrong being a co-operative concern owned by the people of the district, and is supplied with good up-to-date machinery. That of Enderby has the largest capacity and is provided with all the latest improvements. About five miles from Vernon, on the White Valley road, is the Coldstream Ranch, owned by Lord Aberdeen. It is well situated for general farming, with good soil and an abundant supply of water for irrigation purposes. Under the able superintendence of Mr. Ricardo, this farm has been greatly improved and forms a good object lesson. Unquestionably the best apples in the Province are produced in this section of the country, including all points on the lake. Hops are also produced in large quantities by irrigation. The road in this direction connects with Mabel and Sugar Lakes, the headwaters of the Spallumcheen River, also with Creighton Valley, and a cattle trail with Fire Valley and Killarney on the Lower Arrow Lake. Two good waggon roads lead from Vernon to Armstrong and Enderby, and another from the latter place to Salmon Arm, on the main line of the Canadian Pacific Railway. The Spallumcheen River flows past Enderby into the Shuswap Lake at Sicamous, and is navigable for stern-wheel steamers. A great portion of the country is open, some of it lightly wooded, and some of it rather heavily wooded for this part of the country; the principal timber trees being Douglas fir and larch on the higher parts and yellow pine (*Pinus ponderosa*) on the lower levels, intermixed in all cases with a good deal of birch and poplar. The land is all highly fertile, requiring irrigation in that part in the vicinity of Vernon. The necessity for irrigation for the successful production of crops is, however, not as general as was formerly believed—this belief having been somewhat dispelled by the operations of the settlers who took up land on what is known as the Commonage, an extensive tract lying to the south of Vernon, between Okanagan and Long Lakes, and which, in view of the absence of water for irrigation purposes, was not considered worth taking up by the early settlers. By judicious farming and putting in early fall crops, it has been found that a great deal of the land can be successfully utilised for the production of cereals and roots. It is true that a very dry season, such as is sometimes experienced, may prove disastrous, and such a contingency is freely predicted by some of the early settlers, but the fact remains that good crops have been produced on these lands, those of 1900 being the best in the district. In the Spallumcheen Valley and the Salmon River Valley east, that is, in the vicinity of Armstrong and Enderby, irrigation is not necessary, the precipitation being sufficient. The lands lying contiguous to the Spallumcheen River, all the way to Mara, a station on the line of railway north of Enderby, are eminently well suited for dairying.

METEOROLOGICAL REPORTS FOR 1900 AT ENDERBY.

Highest temperature, July	92°
Lowest " (incomplete), February	–15°
Rainfall (incomplete), about	19 inches.
Snowfall " probably over	50 "

AT COLDSTREAM (VERNON).

Highest temperature, July	96°
Lowest " (incomplete), November	–13°
Rainfall (incomplete), about	11 inches.
Snowfall not given.	

The general altitude runs from about 1,150, the lake level, to perhaps 1,500 at the highest points under cultivation.

Mr. Donald Graham, correspondent, Armstrong, sends the following report:—

The Spallumcheen Valley is one of the larger offshoots of the Okanagan. It extends practically from the head of Okanagan Lake, in the south, to the Mara and Shuswap Lakes to the north, a distance of over forty miles, and averaging through its entire length between three and four miles in width. To the eastward the agricultural lands run right up to the foot of a high and somewhat rugged mountain, being only broken midway, near Enderby, by the entrance into the valley of the Spallumcheen River, from which the valley takes its name. To the westward, however, the country is of a more rolling nature, a large portion of the land being available for agricultural purposes.

There is little doubt that at one time the flow of water was from the Okanagan into the Spallumcheen; now, however, the waters divide at Deep Creek, the larger portion flowing southward into Okanagan Lake, thence into the Columbia River; the balance flowing northward into the Spallumcheen, thence into the Fraser River. The whole valley is extremely fertile, the soil being a clay loam, ranging from somewhat light to clays of the heaviest kind, most of it, however, with several inches of black loam on the surface. The rolling and higher land to the westward is mostly a sandy loam, the chief area of which is the Salmon River Valley and land in the immediate vicinity. This land is very productive, and although possibly not averaging as high in wheat returns, for vegetables and small fruits, particularly, it is better adapted than the heavier lands adjoining.

Until now, wheat production has been the chief dependence of the farmers, the returns being very high, averaging nearly thirty bushels per acre. This has always been easily disposed of, there being three flour mills in the Okanagan, one each at Enderby, Vernon and Armstrong, the price for wheat being about 60 cents per bushel. The flour manufactured has deservedly a high reputation in British Columbia, the wheat raised being chiefly Red Fife and Fall Fife, from which the best flours are made. With the development of the Kootenay mines, however, conditions are changing very fast; potatoes, hay and vegetables of all descriptions are being produced in ever-increasing quantities, and bid fair, in a very short time, to force wheat production into a secondary position. Dairying and fruit raising are also coming to the front, so that mixed farming is likely soon to supplant the straight wheat industry. Of fruit, apples, plums, prunes and pears and all small fruits yield abundantly and of the best quality. On Okanagan Lake, peaches, apricots, cherries and grapes do well, possibly on account of the warmer subsoil, although it must also be said that the climatic conditions vary in the most unaccountable manner within a very few miles, a change from sleigh to waggon not being uncommon in a twelve or fifteen-mile winter journey. The climate generally may be described as a very fine one, although we sometimes have exceptionally hot days in summer and extremely cold ones in winter. The winter temperature for four months would not, however, average over ten degrees of frost, with from a foot to a foot and one-half of snow. Going southward to the Okanagan Lake and along its shores, both frost and snow decrease, until the latter becomes a very uncertain quantity on the lower levels.

About 110 square miles of the Spallumcheen Valley has been formed into a municipality, under the valley name. The Council, since its formation, has devoted its energies to the opening up of the district; as a consequence, the farmers are very well supplied with roads. Hardly a farm in the municipality but is somewhere touched by the road system. The Shuswap and Okanagan Railway also passes through the centre of the valley, having six stations along its length of 50 miles, at the northern end of which it intersects with the C. P. Railway. The station at Armstrong is also the municipal centre, and is a busy and thriving little place, with its flour and saw-mills, and constant stream of farm waggons passing back and forth. From an educational point of view, the section is also well served, there being six school-houses situated in convenient localities throughout the municipality, all free and maintained by the Provincial Government, as all British Columbia schools are. The whole section is extremely healthy, there being very little sickness, excepting such as has been brought in by those seeking a health resort. Stock of all kinds is also very free from disease; in fact, we are remarkably free from diseases and pests in both the animal and vegetable kingdoms. The cost of living, machinery, wages, transportation, etc., is high. Were it not for that, the position of the farmers would be an ideal one. However, those conditions are slowly and gradually changing.

There is very little Government land of any value to be obtained throughout the Okanagan now, the lands being all settled upon and improved to a greater or less degree. Under the British Columbia land laws, 320 acres of land was allowed to be taken up by each individual—a great deal more timber land than any ordinary individual could clear. As a consequence, there is plenty of unimproved land, which can still be bought at from $3 to $10 per acre. Improved lands are held at from $40 to as high as $100 per acre, according to quality and locality.

Game in past years has been very plentiful, and is still fairly so; grouse and prairie chicken, geese and ducks on the lakes and meadows. Deer still fairly plentiful, although requiring more hunting to obtain than formerly. In fact, it may be called a hunter's paradise, as a ten days' outing in the mountains can bring one in contact with caribou, mountain goat, mountain sheep, grizzly, black bear and panther, and wolves also. The latter four, however, are wary and very hard to get at.

WHEAT.—Of spring and fall wheat combined, possibly about 5,000 tons; about 6,000 acres under wheat. Production of wheat not very profitable; simply a good living in it; no one, I think, making money, and conditions not quite as favourable is in past years, farmers generally paying more attention to mixed farming. Fattening of stock should be a profitable line here. At present, market somewhat limited; could be easily overdone. No bad effects from frost or weather. Some smut and a little rust in 1900. Price of wheat, about 60 cents per bushel. Jones' Fall Fife; of spring wheat, Red Fife and Pringle's Grandee. There was a light crop in 1900, not over 20 bushels for average.

OATS.—White Sovereign, Banner, Welcome and Danish. Average, about 1,000 pounds per acre. Crops affected by drought; very dry season. About 1,500 acres under oats. Price, $20 to $25 per ton.

OTHER CEREALS.—Peas and beans not grown in quantity.

ROOT CROPS AND VEGETABLES.—The acreage under these crops is increasing greatly, and will receive a good deal of attention in the future. Potatoes fetch about $10 per ton.

GRASSES AND CLOVERS.—Timothy principally; yield, from one to two tons; used chiefly for horse feed. More attention is being paid to clover lately, but it is apparently not as generally successful as timothy.

INDIAN CORN.—No information in favour. It is cultivated sometimes successfully, often the reverse; too easily affected by frost.

APPLES.—Numberless varieties grown successfully; heavy yield in 1900; no bad effect from weather; about 10,000 trees; no diseases; pests, aphis; sprayed with quassia chips and whale oil soap. Ruling prices, $1 per box.

OTHER FRUITS.—Pears and plums do well, but not cherries. Small fruits do well, especially on the higher lands.

HORNED CATTLE.—The production is profitable, and the operation of the "Cattle Ranges Act" is good.

HORSES.—There has been an over-production of horses in the past. The last year or two the horse trade has been improving somewhat; prices higher, but only local demand.

HOGS.—Swine production is one of our chief industries. Price, 5½ cents per pound on foot, during past season. Berkshire, Poland China and Tamworth. Grain too expensive to feed all the year round; must have cheap summer feed, pasture of some kind, rape or clover.

COLD STORAGE.—Should first know more of the meat requirements of British Columbia. We are in absolute ignorance as to the quantity of stock used in British Columbia, where it comes from, or whether we can supply the market or not. If not, how much meat is imported, and where from. We should know all this first.

EXPERIMENTAL STATIONS should be an advantage, and results ought to justify expenditure, if done thoroughly. Our soils are already on the down grade. Successful experiments in ploughing in green crops, and other ways, should be an immense advantage.

SOILS.—Humus lacking. This is where experimental work should do good. How to, in the best and quickest way, supply humus, clover being a very uncertain quantity, hard to grow.

LABOURERS are to be had at $30 per month.

Report of F. Appleton, correspondent, Enderby:—

GRAIN.—Wheat is largely grown and is profitable; price is about 60c. per bushel. Last season 66c. was paid by the Enderby Mill. Oats are grown, the average price being $20 per ton. Other grains not much grown.

ROOTS AND VEGETABLES are not grown in large quantities, but do excellently.

GRASSES AND CLOVERS.—Timothy for hay; red and white clover for pasture. About 3,000 ℔s. per acre for timothy; about 4,000 ℔s. per acre for clover. Timothy is no use except for hay. Mixed grasses and clover do well and make better hay and pasture for dairy stock. Price for baled timothy was $12 per ton.

Austrian brome grass has not done as well as anticipated; makes good pasture, is first to start growing in spring and last to stop in fall. Stock like it.

Bunch-grass is the only wild grass that stock fatten on well.

INDIAN CORN has only been experimented with, but does well.

FRUIT.—Apples, pears and plums all do well; orchards young. Cherries do not succeed so well. Small fruits produce abundantly.

Private dairying is considered profitable, but a creamery would give a great impetus to this branch of farming.

SUMMER FEED FOR DAIRY CATTLE.—Corn sown first week in June; peas and oats in rotation also assist in keeping up supply. Have no difficulty if people take a little trouble.

CATTLE.—Cattle do well here, but bulls should be kept shut up and not allowed to range. Milch cows bring from $45 to $60 each; beef cattle, about 5c. per pound. For beef, Durham and Ayrshire, and for milk, Jersey crossed with these two breeds.

SHEEP.—Sheep are only kept on a very limited scale. Coyotes are troublesome. Want of open range and winters too long for profit. Prices 5c. per ℔., live weight; 7c. for wool.

HORSES.—Horses are fetching a fair price. It pays to breed heavy horses here, such as Clydes or Shires. Good, general-purpose horses also sell well.

HOGS.—Swine production is not general; a few large droves are kept. Price, 5½c., live weight. Hogs grazing on white clover grow fast with a very small amount of feed, and finish off on stubble.

POULTRY.—Poultry production pays well, although the long winter's confinement is very much against poultry in this district. Four to five months' snow does not allow of the birds getting about. Eggs average 25c. per dozen; fowls, 10 to 12½c. per. ℔.

SOILS.—Humus is the most lacking in the soil in this district; to remedy this, green crops should be turned in.

LAND.—Some Government lands up Mabel Lake Valley. Farms can be bought for from $5 per acre up to $40.

LABOUR.—Whites, $25 to $30 per month and board; Chinese, only cooks employed; Indians, during harvest, get from $1.25 to $1.50 per day.

Shuswap Lake,

In which is included Craigellachie, Sicamous, Salmon Arm, Notch Hill and Tappen Siding, comprising all that portion of the country between Craigellachie and Shuswap, on the main line of the Canadian Pacific Railroad. This section is peculiar, in that it is all wooded more or less heavily, and that the precipitation is ample for agricultural purposes.

Craigellachie is in the valley of Eagle River, which flows into the Shuswap Lake at Sicamous, and is on the main line of the Canadian Pacific Railway. It is on the foot-hills of the Gold Range, sixteen miles to the east of Sicamous. The valley is fairly wide, but heavily timbered. Altitude, 1,223 feet.

At Griffin Lake, near Craigellachie, the meteorological record for 1900 was as follows;—

Rainfall	52.32 inches.
Snowfall	133.0 "
Highest temperature (July)	110°
Lowest " (February)	– 18°

Sicamous is situated at the head of the Shuswap Lake, where the Shuswap and Okanagan Railway joins the main line, sixteen miles west of Craigellachie. There is some farming done in a small way about Craigellachie, but none at Sicamous, although there is bottom land at the latter place which could be utilised if cleared.

Salmon Arm is a settlement in the Valley of the Salmon River where it debouches into the Salmon Arm of Shuswap Lake, nineteen miles to the north-west of Sicamous. The C. P. R. runs through the settlement and a waggon road connects it with Spallumcheen. All kinds of grain, except corn, are produced. Wheat growing is profitable for home use, but not otherwise. Timothy and red clover mixed give the best result for fodder and seem well adapted to

SPALLUMCHEEN VALLEY.

the place and climate. The district is especially adapted for the production of fruits and for dairying, and, on account of its favourable shipping facilities both east and west, large quantities of small fruits, vegetables and milk are sent to the markets along the line. The altitude at the station, which is nearly at the level of the lake, is 1,152 feet, the rise up the valley being inconsiderable; the mountains, however, rise to a considerable elevation on either side.

Besides the railroad, this part of the country has water communication *via* the lake and Thompson River with all points as far as Savona in one direction, and up the Spallumcheen River, as far as Enderby, in the other.

Tappen Siding is seven miles west of Salmon Arm, and at about the same altitude. Notch Hill is ten miles further on, at an altitude of 1,687 feet, it being on the height of land between Tappen Siding and Shuswap. This district is quite thickly wooded.

Report of Mr. W. F. Smith, correspondent, Tappen Siding:—

GRAIN.—Only oats and peas grown in any quantity and cut green foi hay.

ROOT CROPS.—Potatoes do well; yield, about 6 tons per acre; ruling price in 1900, $10 to $12 per ton. Others principally for home use in feeding stock.

HAY AND GRASSES.—Timothy, Alsike and Red clover are the principal grasses grown for hay, timothy being the most popular. Ruling price, $12 per ton.

INDIAN CORN can be grown for ensilage. I planted ¼ acre last year (as a test) on the 1st of June. When the frost came the corn was just shaped on the cob. The yield was 40 tons of green fodder per acre. The variety planted was Giant Prolific Ensilage. Lost most of it on account of having no silo.

Not many apple trees in this district.

LABOUR.—Whites, $30 per month; Chinese, $20; Indians, $20.

Thompson River Valley,

Including Shuswap, Ducks, Grand Prairie, Kamloops, Campbell Creek, Cherry Creek, North Thompson and Tranquille.

Shuswap is westward from Notch Hill fifteen miles, and is lower by 541 feet, with a drier climate and an open country. Communication east and west by rail and water.

At Kamloops the rainfall for 1900 was 10.18 inches; snowfall, 6.6 inches; lowest temperature (February), - 10.1°; highest (July), 93.4°.

The following is the report of Mr. J. P. Shaw, correspondent, Shuswap:—

WHEAT has not been grown in large quantities in the past; favourable for milling wheat. (A large acreage, I understand, is now being put in.—J. R. A.) Price from $20 to $25 per ton.

OTHER GRAINS.—Considerable quantity of oats produced. Peas not successful.

ROOT CROPS.—Potatoes are grown in considerable quantities, but the yield was much reduced through the ravages of cut-worms in 1900. Price from $10 to $15 per ton.

HAY AND GRASSES.—Timothy, Red and Alsike clover are grown. Crop averaged 2 or 2½ tons per acre. Sold in stack at $10 per ton. For dairying, Timothy is not considered as good as clover.

INDIAN CORN.—Very little grown, and does not thrive so well as in parts of Ontario, owing, I think, to cold nights and late spring and early autumn frosts. Grown with partial success in well-protected spots.

APPLES.—All common varieties, such as Transparent, Wealthy, Duchess, Fameuse, Alexander, Rhode Island Greening, Russet, Ben Davis, etc., grow to perfection; yield last year, fair; weather, favourable. The oyster-shell bark louse is quite bad; spraying with lime, salt and sulphur, or bluestone and lye. Price last fall was about 3c. per pound.

OTHER FRUITS.—Pears do well; price, 5c. per pound. Plums and prunes also, and small fruits successful.

HORNED CATTLE.—Beef steers are worth $40 and cows $30; profitable and large industry.

HORSES.—Horses here are poor property, as quality is not such as to be in demand. If the horses here could be disposed of and replaced by cattle, or even a better class of horses, it would undoubtedly be advantageous to owners, and would save the ranges. Horses weighing from 1,100 to 1,400 pounds would answer all purposes. Horses here do not fetch very much, as they are too small and scrubby.

SHEEP.—Sheep raising is very little engaged in, though small bands are profitable. All flocks here are grades. I think Southdowns or Cotswolds the best breeds. Sheep sell from $5 to $8 dressed; wool, 8 to 12 cents. Coyotes are very destructive, which is the greatest hindrance to the industry. Climate and other conditions are very favourable.

HOGS.—Very few hogs are raised. Hogs on foot are worth 5c. per pound; bacon retails at from 14c. to 16c., and hams at 20c. per pound.

POULTRY.—Poultry raising is not entered into, although profitable. Price of fowls, $6, and eggs average 25c. per dozen.

EXPERIMENTAL STATIONS.—I think it better for the Province to handle this, as, if done by the Dominion, what applies in one part does not in another. I think if we had Experimental Stations situated, one at the coast, one near Kamloops, and one in Okanagan, it would be beneficial.

AGRICULTURAL EDUCATION.—I am opposed to agriculture being taught in public schools for the following reasons, viz.:—

1. Many teachers were never on a farm, and are, therefore, not qualified to teach it.
2. In rural districts, the young can learn more by practical experience on a farm than by theoretical teaching.
3. The time of many pupils' school life is limited, and could be used to better advantage in studying other subjects.
4. In city schools, and in many instances in rural schools, the pupils are not at all interested in the subject, and would never put the learning (if they got any) to any practical use.

IRRIGATION is necessary for the successful production of crops, and is consequently carried on to a large extent, by means of ditches, by natural gravitation, the soil being favourable for the purpose, and there being a sufficiency of water for present needs.

PESTS.—Cut-worms appeared first in May, destroying the first sowing of vegetables, but not to any serious extent. The large ones appeared about Aug. 10th, and, in places, totally stripped potato vines and attacked apple trees, destroying considerable fruit, and disappearing about Sept. 1st. Cannot give you any times as to egg-laying, etc.

NOXIOUS ANIMALS.—Skunks and coyotes and hawks. Coyotes are apparently on the increase. The present bounty, viz., $2, is not large enough to induce anyone to make a business of destroying them. I would favour raising the bounty to $3, or even more. Wolves are seldom, if ever, seen in this section, except by hunters, and are out of settled parts.

LABOUR.—Whites, $1.25 to $1.50 per day, or $30 to $35 per month, with board; Chinese, $15 to $25 per month, with board; Japanese, $15 to $20 per month, with board; Indians, $1 to $1.25 per day. Indians plentiful; Japanese and Chinese not resident, and, if wanted, have to be procured from the cities.

Ducks and Grand Prairie, the former being on the Thompson River and the main line of the Canadian Pacific Railway, sixteen miles below Shuswap, and the latter about fourteen miles to the south-east, on the waggon road to Spallumcheen. The altitude of Ducks is 1,148 feet, with a considerable rise towards Grand Prairie.

COMMUNICATION.—The Canadian Pacific Railway passes through Ducks, and a good waggon road leads from Kamloops, seventeen miles distant, past Ducks to Grand Prairie and Spallumcheen.

SOIL, WATER AND TIMBER.—The soil is generally a light, sandy loam near the river, and of a heavier nature towards Grand Prairie; productive when water is available, but which is not always the case, especially near the river. Timber is fairly abundant on the hillsides.

CROPS AND FRUIT.—Cereals and root crops produce well, but are raised principally for feeding to stock. Fruit will no doubt do well in parts, but it has not as yet been extensively produced.

LIVE STOCK.—Many cattle and horses are produced, the former almost entirely for beef, little or no dairying being done. Sheep raising is not prosecuted to any extent. Swine are produced in greater quantities than probably in any other part of the Province, and are found to be very profitable. An excellent country for poultry, but the industry is quite neglected.

Report of Mr. V. D. Curry, correspondent, Campbell Creek:—

WHEAT.—Red Fife, Campbell's White Chaff, Ladoga and Club are grown, but not much is produced; principally for chicken feed at home and for the local market. I believe it is more profitable to feed grain on the farm and buy the flour. Frosts don't bother, except on the higher levels. No diseases. Average production, 30 bushels per acre.

OATS.—Oats are largely grown; yield, 40 bushels per acre. Other grains are grown in small quantities, principally for use in feeding stock.

ROOTS.—Root crops are all grown to great perfection, but the yield was much reduced last year through the depredations of cut-worms.

HAY AND GRASSES.—Timothy, Red Top, Cocksfoot, Red and Alsike clover, Alfalfa and Sanfoin are grown, and produce about 1 ton of hay per acre; price, about $12 per ton. I consider many other grasses, such as clover, Sanfoin, Alfalfa and Cocksfoot, much better from a feed point of view.

CORN.—Indian Corn can be successfully grown in some parts of this district. I believe it would make a first-class soiling plant, providing silos were introduced. Have grown it successfully myself, and also many others.

APPLES.—All hardy varieties very good. Not affected by weather, except hail in some sections. Green aphis and bark lice are troublesome. Principal remedy, tobacco for aphis, lye for bark lice. Ruling price, 2½ cents per pound.

OTHER FRUITS.—Pears, plums and cherries attain great perfection in all parts of the district, and peaches and apricots in some parts. Small fruits very productive, and prices good.

DAIRYING.—Private dairying is very profitable in this country, and I am suprised that more people are not interested in it. Co-operative creameries could not be worked in this district; distances are too great. Unless we get a better class of stock, it will not pay to specially breed stock for dairying here in the winter. I believe farmers will make more by liberally feeding stock cattle, instead of the starvation plan that is practised by many in this district.

CLOVER.—I believe clover as a summer soiling crop is invaluable in the interior; it can be cut often.

HORNED CATTLE.—The production of horned cattle is a successful industry. Prices are 3½ and 4 cents on foot for beef; good milch cows $40 and $50 per head of ordinary stock. Shorthorn and Hereford for beef; milking strain of Shorthorn for dairy, as they also make good beef.

SHEEP.—Sheep are hard on the ranges in the dry belt, and in time would utterly ruin them. The district is, however, suitable for sheep, and the industry is carried on to some extent with profit. The breeds favoured are Leicesters and Cotswolds. Prices range from 12 cents to 15 cents per pound. Coyotes are a nuisance.

HORSES.—Horses have been profitable. A breed like the Cleveland Bay I consider best. Horses weighing 1,500 pounds and upwards fetch $100 and upwards.

HOGS.—Swine production is prosecuted systematically. Pigs on foot sell for 6 cents to 7 cents; bacon, 15 cents; hams, 18 cents, and lard 15 cents per pound. Berkshires and Tamworths are recommended. Hogs can be most cheaply produced on clover, and fattened on peas in the straw in the fall.

POULTRY.—Poultry raising is very remunerative, but not taken up systematically. Leghorns are recommended for eggs, and Plymouth Rocks for table. Prices, 30 cents per doz. for eggs; $4 per doz. for cockerells. Many people make an easy living in cattle raising, and won't take the trouble to attend to the details necessary to success in poultry.

DISEASES.—Lump-jaw is prevalent amongst cattle, and distemper amongst horses. There should be range riders to report on diseases.

CO-OPERATION.—We are succeeding better now. The Farmers' Institute is doing good work in regard to transportation. I think the Provincial Government ought to establish small Experimental Stations in the interior, where irrigation is in vogue. There is a great lack of knowledge in regard to proper irrigation, and the crops best adapted to it.

SOILS.—Manure is required more than anything else. Clover, rye, millet, etc., ploughed under will certainly overcome this.

IRRIGATION is necessary, and is carried on to a considerable extent. The supply of water could be materially increased by conserving it, and many thousands of acres brought into cultivation. The cost of ordinary irrigation ditches is about $500 per mile. In isolated cases water has been pumped by steam, etc.; don't think it was remunerative. Government should certainly take hold of the irrigation question and store water for the farmers, thereby making available for agriculture thousands of acres of now barren land.

POISONOUS PLANTS.—The only poisonous plant coming under my notice is the water hemlock or wild parsnip, which is very deadly. No remedy has been proven here yet.

FOREST FIRES.—Can't suggest any plan for the prevention of forest fires. My opinion is that the commonest cause of fires in this district is Indians and others camping out in the timber and neglecting the fire. I believe carelessness has a great deal to do with it.

LABOUR.—Whites, $30 and $40 per month; Chinese, $20 to $30; Japanese, $15 to $25; Indians, $30 to $35.

Report of Mr. J. F. Smith, correspondent for North Thompson and Louis Creek:—

That which is known as the Louis Creek section comprises an extensive area of excellent agricultural land, admirably adapted to mixed farming and stock raising. The soil along the river front is mostly of a rich, sandy loam; in certain parts a heavy clay. This section begins practically from a point known as the "Fish Trap," and includes the Adams Lake Valley, the Louis Creek Valley, and extends and includes the North Thompson Valley. The initial point of Louis Creek is at the confluence of that creek with the North Thompson River, a distance of thirty-six miles from Kamloops. There is a good waggon road from Kamloops to and beyond that point, and the river is navigable for a considerable distance beyond. Good fishing is had on both Louis Creek and the Barrier River, four miles beyond. The district has a promising future, in consequence of its vast resources, as it abounds in mineral. There are large deposits of excellent bituminous coal and a large area of excellent land, which will furnish homes for hundreds of families, and to which the attention of incoming settlers will surely be directed. This section is worthy of the attention of the Government.

WHEAT.—On the Josephine ranch, which is about six miles south of the point I outlined to be included in the section, W. W. Shaw threshed about 90 tons of fall wheat. He devotes about 100 acres of his place to fall crop. None of it is raised for milling, but is applied chiefly to fattening hogs and for chicken feed. Where the soil is as heavy as it is at some points in this section, I can see no good reason why wheat could not be raised for milling purposes in sufficient quantity to supply say 100 barrels per diem. This would not necessitate the going into exclusive wheat raising. The Red Fife is considered the best. This section produces a first-class quality of hard wheat. The crop was not affected from any cause. There were about 200 acres under wheat. The average yield was about three-quarters of a ton to the acre. A ready market is had in Kamloops, the ruling price being from $20 to $26 per ton. As the wheat is used for feed, so far very little attention has been given to the selection of seed or variety. Very heavy yields have been obtained in the wheat crops, particularly so in the Adams Lake Valley, where as high as one and a-half tons have been produced to the acre. The same results have been obtained at particular points in the Louis Creek and Dixon Creek valleys.

OATS.—The same can be said in regard to the selection of seed. However, the Gothland, Banner and Flying Scotchman are varieties that have proven heavy yielders in this section. In places such as Adams Lake, and at certain points in the Louis Creek and Dixon Creek valleys, the growth is very rank, sometimes causing the grain to lodge. The yield at these points is from 1,800 to 2,000 pounds to the acre. The general average yield in the district is about 1,500 pounds to the acre. Ruling price, $20 to $30 per ton.

OTHER GRAINS are grown, and the yields are good, but are produced principally for feed. Beans are successfully grown as a field crop.

POTATOES yield from 6 to 8 tons to the acre; prices range from $10 to $15 per ton.

TIMOTHY, Clover and Alfalfa are the principal grasses grown.

INDIAN CORN is successfully grown.

FRUIT.—Very little attention, so far, has been given to fruit-growing. On the Louis Creek Ranch there is a small orchard of about twenty-five trees of the hardy variety of apples, which is doing well. The most of the trees are now in bearing. In the Adams Lake Valley a few trees were put out on the Raven Ranch; they also have done well. I am of opinion that fruit trees of the hardy kind would thrive in certain localities of this section. Small fruits of every kind do well. Strawberries and raspberries are exceptionally luscious. There are no diseases.

CATTLE.—Cattle raising is practically the only paying branch connected with the agricultural industry in this section. Each settler is aiming to increase his herd; there are about

RANCH, CAMPBELL CREEK, KAMLOOPS.

1,500 head of cattle in the district at present. The "Cattle Ranges Act," as it stands, is a dead letter, from the fact that there is no one to put it in force. What is required to make it effective is the appointment of mounted constables or range riders.

SHEEP.—This is not a sheep country. Sheep would not pay on account of the inroad of wild animals.

COLD STORAGE.—The farmers in this section have expressed themselves in no uncertain terms in favour of cold storage; they seem to have a full appreciation of the advantages of such provisions, and I am sure would willingly co-operate in its maintenance.

EXPERIMENTAL STATION.—I am strongly of the opinion that an Experimental Farm established in the Dry Belt would be of incalculable benefit, and advantageous to the interior of this Province. The Dominion Experimental Farm at Agassiz is doing excellent work, but it must be remembered that both the soil and conditions there are entirely dissimilar to that of the interior, that being in the wet, where crops are grown without irrigation, while in the interior irrigation is needed. Therefore, I think an Experimental Farm somewhere in the Dry Belt would be of great benefit in disseminating agricultural information. I think the results would amply justify the expenditure.

FARMERS' INSTITUTES.—The Farmers' Institute is doing good work here. We have one in this district, and those connected with it are pleased with the work it is doing. It is a medium through which much knowledge flows to the farmer, on matters directly affecting his interests, which would have otherwise been overlooked.

IRRIGATION.—Confining myself to the Louis Creek section, irrigation is carried on to some extent, but in many years crops are raised without irrigation. Nearly all the occupied land has sufficient water for present use.

TIMBER.—The principal trees in this section are fir, bull pine, jack pine, birch, cottonwood, poplar, willow, spruce, cedar, hemlock and balsam. These are found on both wet, dry, high and low land.

FOREST FIRES.—The best means for preventing forest fires is in the appointment of forest-fire rangers, whose duty it would be to protect the forest from fire, by prosecuting offenders, as forest fires are most generally caused by carelessness, sometimes by Indians, and again by prospectors. The "Bush Fire Act," without some one to enforce its provisions, like the "Game Protection Act," is all waste paper, so far as its effectiveness is concerned.

LAND.—There is over 50,000 acres of excellent arable land that is available for pre-emption in this section. It is outside of the Railroad Belt, and is all good bottom land on both sides of the North Thompson River, lightly timbered with some fir, poplar, cottonwood, willows and such like, extending for eighty miles up the river.

LABOUR.—Labourers can be obtained: Whites, from $25 to $35; Chinese, $35 per month; and Indians $1.50 per day.

Nicola,

In which is included Upper, Central and Lower Nicola, is a fine pastoral country, with extensive valleys of good land for general agriculture. A waggon road, some 110 miles in length, having its termini at Spence's Bridge and Kamloops, gives access to the Canadian Pacific Railway. The Douglas Lake Cattle Company and the British Columbia Cattle Company have extensive cattle ranges in this section, where a large number of beef cattle are produced for the coast markets. General crops of grain, grasses and roots are successfully produced with irrigation, the soil being very productive, and available water is to be had in most parts. Large fruits are not generally successful, but are produced in some favoured spots, such as Quilchena, on Nicola Lake. The altitude of the lake is variously given at from 1,920 to 2,120 feet, that of Spence's Bridge being 996 feet, and of Kamloops, 1,153 feet.

At Nicola Lake, for 1900, the rainfall was 12.43 inches; snowfall, 19.4 inches; temperature, lowest (November), - 18.5°; temperature, highest (July), 89.0°.

Mr. Thomas Bulman, correspondent, Upper Nicola, reports as follows for vicinity of Stump Lake:—

WHEAT is only raised for hog and chicken feed, there being no flour mill in the district—a much-felt want. Production is about 28 bushels per acre, first-class for milling; Red Fife and White Russian. Ruling price, $25 per ton.

OATS.—Early Gothland, Tartarian, Egyptian and Banner are cultivated, the latter being the most suitable. Price, $25 per ton.

BARLEY.—Duck Bill and 6-rowed is grown to some extent. The soil is adapted to barley growing, and we could raise quite a lot of a good quality if there was a market.

RYE.—Fall rye is grown, but not extensively.

POTATOES are very successfully grown, but the crop this year was light, on account of the wet season and the ravages of the cut-worm. Ruling price, $10 per ton. Varieties grown: Early and Late Rose, Beauty of Hebron, Snowflake and Burbank Seedling.

HAY AND GRASSES.—Timothy, large Red clover, Alsike and Sanfoin are the principal grasses; about two tons to the acre. Prices ruling, $5 to $10 per ton. Timothy is our best grass; it seems to stand the changes of the weather better than anything else. Alfalfa is far better for stock where it will grow. Austrian Brome grass, what little I have seen, has been very successfully grown and stock seem to like it.

HORNED CATTLE.—The production of beef cattle is profitable, but I am of opinion that sheep pay about twenty-five per cent. better. Price of beef cattle, 3½ cents per pound; milch cows, $45 per head. Herefords and Durhams are bred.

HORSES.—The horse industry is looking up, and is on a little better basis here now. Most people are going in for heavy horses; there have been far too many horses raised, and there is no doubt but the same capital invested in cattle, sheep or hogs would pay better.

SHEEP.—Sheep raising is carried on to a small extent, and pays very well. Cotswolds, Shropshires and Southdowns are the favourites. Ruling prices are $3.50 for lambs, $5 to $7 per head for ewes and wethers. They bite a little too close for bunch-grass.

LANDS.—There is no land available for pre-emption suitable for farming. Improved farms can be bought at $4 to $5 per acre—good paying investments.

LABOUR.—Whites, $25 to $30 per month; Chinese and Japanese, $20 per month. We get plenty of help of any class.

Mr. John Clapperton, correspondent, Central Nicola, reports as follows;—

The village of Nicola Lake, at which point the Provincial Government Office is located, is about the centre of the division. It is situate by waggon road from Spence's Bridge, C. P. R. station, 50 miles; from Kamloops, 60 miles; Princeton, 70 miles. A bi-weekly mail service between Kamloops and Spence's Bridge, through the whole Nicola Valley, exists; a weekly mail service between Nicola Lake and Princeton. Telephonic communication between Lower Nicola and Kamloops is present, and much valued by the people. Railway transit is expected through the division ere long.

WHEAT.—Sowings of fall wheats in the Nicola Division have always been limited, certainty of crops depending greatly on snowfall. If wheat plants get well covered with snow, crop is generally very good; light snowfall and intense frost means mischief to winter wheat. Spring wheats are in general cultivation, but there is now very little wheat grown in the district. Flour, of best quality, can be brought into the valley and sold as cheaply as that made from local wheat. Prices were $1.25 to $1.50 per 100 pounds, mostly for poultry feeding.

OATS.—Nearly all the best white varieties are more or less grown. Crop of this year (1900) averaged between 40 and 50 bushels per acre. The grain filled well, and thrashed freely. Did not hear of any blight on oat crop. Last spring oats were worth $2 per 100 lbs.; present price, on the farm, $1.25 per 100 lbs.

RYE is only grown in late locations and on high lands, and is cut and saved for cattle food.

PEAS are only grown in limited quantities for swine feeding.

POTATOES were this year a good average crop, when cut-worms were not present. Most people prefer the white-skinned potato. Potatoes are only grown for home use.

All hardy vegetables and roots are grown for home consumption. This year nearly all the cabbages were killed by cut-worms.

GRASSES AND CLOVERS.—Red, Crimson and Alsike clovers; grasses, Perennial Rye, Cocksfoot (orchard grass), Kentucky Blue and Timothy, form the mixture in general use. From 1½ to 3 tons of cured hay per acre, is about the annual yield from irrigated meadows. Fertilisers and mulching will soon be requisite to keep up returns from lands cut year in and year out. I have no personal experience of the Brome grass. No artificial grasses will grow in this dry section without irrigation; and when water is used, clover and grasses fill the bill.

NATIVE GRASSES.—The only indigenous grass in this division, in profusion, is the famous bunch-grass (*Agropyrum divergens*). Upon it all our animals feed and fatten, if the herbage holds out. Have seen the wild *Bromus inermis*; it is not common, and better for hay than pasturage.

ENSILAGE.—Our dry climate in June, July, August, and often September, favours the curing or drying of all fodder plants; and unless winter dairying comes into practice, I doubt if any one of the present stock-raisers and farmers of Nicola ever builds a "silo."

FRUITS.—Nearly every farmer has apple trees, and they are by no means a success. When trees get to be of any size some kind of a dry rot attacks them, and down they go. Plums and cherries do well in places, and small fruits of all kinds do splendidly.

DAIRYING.—No creameries at Nicola and very little butter made.

FEEDING.—The fattening of beef cattle for spring use is carried on to some extent by a few farmers who have a surplus of hay and roots. The feeding has been a success so far as the animals are concerned, and it just about pays the feeders, but nothing more. So far, house-feeding has not been introduced.

HORNED CATTLE.—Stock-breeding and feeding is the main industry of the division. Breeds comprise Shorthorn, Hereford and Polled Angus. As a beef-producing animal, perhaps preference is given to the Herefords; they are hardy cattle, carrying fine coats of hair, which help them in cold weather.

HORSES.—Horse-breeding has not been a profitable pursuit of late years; very little demand for even good animals at low prices. There are a number of very serviceable horses for sale throughout the district.

SWINE.—Some two or three farmers breed and feed pigs for the Coast consumption. Berkshire, Chester and other breeds are kept by those engaged in raising them.

SOILS.—Cultivation in this division has been so far limited. Scientific farming is ignored. All lands under irrigation yield good returns, notwithstanding the neglect, in many instances, of manures or other fertilising agencies.

CLEARING LANDS.—Large areas of bottom lands have been cleared. Stumping machines were tried, but as the timber was chiefly willow, cottonwood, light birch, etc., hand labour has been considered best. The cost of clearing land depends entirely on how it is done, and the density of undergrowth and timber to be removed.

DISEASES OF ANIMALS.—So far our horned cattle have been exempt from contagious disease. Horses are subject to epizootic, etc.; have never heard of a case of glanders.

IRRIGATION.—Outside of indigenous plants, cereals, roots, artificial grasses—in brief, everything that requires cultivation—must on all plains or bench lands be irrigated. Most ranches are fairly supplied with water.

WEEDS.—The Act is not enforced against thistles as vigorously as it should be. Thistles are spreading, and will soon be hard to deal with. Canadian thistles were introduced in this section through oats imported from the East.

CUT-WORMS.—The range of the cut-worm last summer appears to have been provincial. Would like to know how entomologists account for their wide-spread presence and sudden appearance, last summer, in such numbers.

LANDS.—Very little Crown land in this division open to pre-emption; all taken up years ago that was worth locating. Mountain pasturage is $1 per acre; arable land that can be irrigated, $2.50 per acre; wild meadow, $5 per acre.

LABOURERS.—Whites, $1.25 to $1.50 per day, with board; Chinese, $1; Japanese, $1; Indians, $1, $1.25 and $1.50.

Mr. H. S. Cleasby, correspondent, Lower Nicola, reports as follows:—

This district forms part of the well-known Nicola Valley, being, in fact, the lower end of that fertile trough in British Columbia's sea of mountains. The valley, as a rule, is not more than three-quarters of a mile wide, through which the Nicola River meanders with many a turn and twist. In what is locally known as the Forks, being the land at the junction of the Nicola and Coldwater Rivers, is a triangle of level land, containing about 1,000 acres of very fertile land. The alluvial soil along the banks of the rivers, originally covered with a heavy growth of poplars, willows and alders, is, when cleared, very productive, producing immense crops of hay and grain. The bench lands, when sufficient water can be procured, are capable of growing almost anything which can be produced in the temperate zone. The principal industry is cattle raising. Some cattle are winter-fed for the spring market, affording an outlet for surplus hay. There is a local market with teamsters and the neighbouring mining camps of Aspen Grove, Granite Creek and Similkameen, for a certain amount of grain and garden produce. The population is scattered. There is one school at Lower Nicola. Fish abound in the rivers and streams, and there is no lack of shooting in the proper season.

WHEAT is not much grown, owing to lack of milling facilities. Golden Drop is the principal fall wheat grown; average crop, 2,000 pounds. Campbell's White Chaff and White Australian are the principal spring wheats; average yield, 1,500 pounds. Prices, $30 for new and $35 for old.

OATS.—Improved Ligowo and White Maine are grown. The first-named gave a crop with myself of 76 bushels per acre, weighing 44 pounds per bushel. Average yield, 1,500 pounds per acre. Price, up to Sept. 1st, $45 per ton; new crop, $25 per ton. I practise bluestoning oats, as advised by Dominion Experimental Farms Report, about every second year.

BARLEY.—Only common, Six-rowed variety grown here, and not much of that. Yield, about 2,000 pounds per acre; price, $25 per ton.

RYE.—Fall rye is the only kind grown; only grown by myself in this district for seed. Many people at higher altitudes grow it to cut for hay. Yield, 1,100 pounds per acre; price, $30 per ton. Not a very profitable crop.

PEAS.—Varieties: Alaska, Mummy, Shropshire, Hero, Victoria, Golden Vine, principally. Yield, 2,000 pounds per acre; price, $25 per ton. More might be grown to advantage, as their effect in increasing the fertility of the land is most marked in succeeding crops.

POTATOES.—Early Rose, principally; also American Wonder, Green Mountain and Late Puritan. Yield, 6 to 7 tons per acre; price, $10 to $15 per ton. Some damage reported from cut-worms. Have observed a little disease these last two seasons, which have been exceptionally damp.

MANGOLDS.—Golden Tankard has done best with me so far; keeps well and is easily harvested. Long Reds give largest crop, but do not keep so well and cost more to harvest. None other grown, to my knowledge. Yield, 14 tons per acre. Grow them only for own use; feed them to fatten cattle.

TURNIPS.—Very few grown. Yield at the rate of 20 to 25 tons per acre. Purple Top Swede seems to do best; had them weigh as high as 24 pounds this year.

SUGAR BEET.—I grew some beets this year from seed supplied by Vancouver Sugar Refinery. Did fairly well; crop about 10 tons per acre on unmanured land. Nothing known as to sugar content.

GRASSES AND CLOVERS.—Timothy, Red and Alsike Clover, Sanfoin, a little Alfalfa, and some Cocksfoot. Timothy and a mixture of the clovers is the favourite here, and seems likely to remain so. Timothy is not a pasture grass, but it is not pasture but hay that we are after. Average yield, about 2,500 pounds per acre; price, from $6 to $10, loose; about $2.50 per ton extra for baling.

AUSTRIAN BROME GRASS.—It has not done well with me; has not been tried to any extent. I found that Volunteer Timothy among my Brome Grass was much the heavier yield.

NATIVE GRASSES.—My experience in feeding leads me to believe that some of the native grasses of the country are most nutritious.

INDIAN CORN.—Sweet corn for table use does well enough some seasons; have seen ensilage corn here 11 feet high.

RAPE.—Tried it this year as a soiling crop. For pigs am well satisfied with it; shall sow it again.

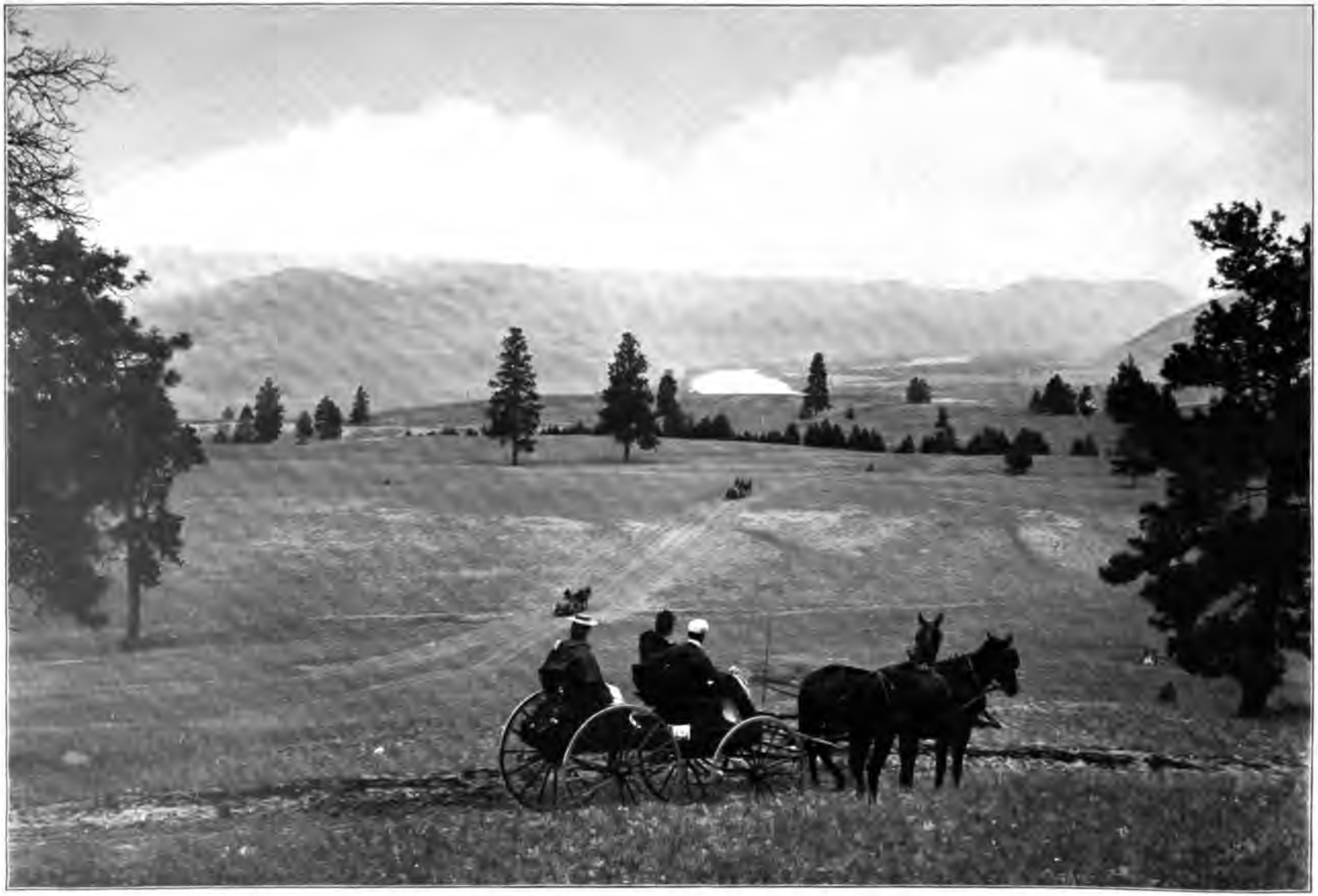
APPLES.—Only the hardiest varieties of apples are a success here. Crabs of different kinds are grown. Crop small on account of late spring frosts. Prices low, 2½ cents, on account of large crop in other places.

OTHER FRUITS.—Pears a precarious crop. Plums, the same. Cherries do well, but were injured by frost this season.

SMALL FRUITS do splendidly. All kinds of currants, raspberries and strawberries produce abundantly. Gooseberries are subject, more or less, to mildew.

DAIRYING.—Some parties on outlying places milk several cows. In the Nicola Valley itself, pasturage is too scarce and scant. People won't milk after they get a good band of cattle around them. Probably about 1,000 pounds of butter produced, which does not sell well at all, in competition with creamery butter.

FEEDING.—Have fed cattle for beef for some winters past; until last winter have fed hay alone. Last winter fed 15 to 20 pounds per head each day of pulped mangolds, mixed with



CATTLE RANGE, THOMPSON RIVER IN DISTANCE, KAMLOOPS.

clover chaff, with satisfactory results. Feed twice a day with hay in cribs, at the rate of from 40 to 50 pounds per day per head. About one-fourth of this is left, and periodically the cribs are cleaned out and the refuse hay given to stock cattle. Roots are given in middle of the day.

HORNED CATTLE.—The principal industry, and at present in a thriving condition, because of high prices. The cattle and sheep industries will not thrive alongside of each other. Cattle will not graze after sheep. Prices—Fat steers, 3½ cents per pound, live weight, $40 per head; fat cows, 3 cents per pound, live weight, $30 per head. Prefer Shorthorns.

HORSES.—Profitable, if good ones are bred; not an over-production of good horses. A great scarcity of suitable saddle-horses, which are in constant demand. Heavy team horses find a ready sale in the Coast towns; also light horses, suitable for express and other light waggons. The great bulk of the horses here are neither one nor the other.

SWINE.—Some people make it the principal part of their business. Pigs on foot are worth 5½ to 6½ cents per pound; dressed pork, 8 to 9 cents; bacon and hams, 12 to 18 cents.

DISEASES OF ANIMALS.—Epizootic has been noticed among horses, but we are singularly free from disease. Lump-jaw is considered to be on the decrease.

EXPERIMENTAL STATIONS.—Could not this be done better by co-operation between the two Governments, and something on the lines of Prof. Robertson's scheme of "Illustration Stations"? Let the seed be supplied from the Dominion Experimental Farms, and the grower be allowed so much by the Provincial Government for his trouble, etc., in keeping records and showing people around, the grower to be allowed to keep the crop. Experimental stations need to be plentiful in this Province, on account of the great difference in climate experienced. As to its being the duty of the Dominion, I think not in the small way that I have outlined it. The County Councils are doing this work in Great Britain.

AGRICULTURAL EDUCATION.—I doubt if a mere smattering of the subject such as would be taught in a public school, will be of much benefit. A few scholarships to the Guelph Agricultural College, or some similar institution, offered for competition among farmers' sons—at least one scholarship for each electoral district embracing agricultural land—would, I think, be of more lasting benefit. Thus many who now despise "book-farming" would be able to see from results what practical scientific farming can do.

SOILS.—There is a deficiency of lime, in my opinion. Plenty of limestone in vicinity, not worked as yet.

IRRIGATION is necessary in most cases; along the river bottoms, however, the high water in summer, caused by melting snow in the mountains, moistens the low land sufficiently. In this district there is an abundance of water.

TIMBER.—The timber trees are:—Yellow pine, dry lands; fir, damp and rocky lands; poplar, semi-damp lands; cottonwood, alder, black and silver birch, damp lands; black pine, dry mountains; water spruce, wet mountains.

WEEDS.—We have plenty of Canadian thistles, which are on the increase. What seems likely to prove a worse weed is the perennial sow thistle, which is spreading badly in this neighbourhood. Other bad weeds are wild oats—one farmer (?) cultivates them for hay—false flax, wild turnip and wild buckwheat.

ENTOMOLOGICAL.—Cut-worms did some damage in a few isolated cases, principally to gardens.

NOXIOUS ANIMALS AND ANIMAL PESTS.—Complaints have been made of coyotes killing calves and foals on the mountains. Present bounty ($2) sufficient. Panthers seem to be becoming more abundant; cause unknown.

LANDS.—No Government land left worth taking up; no railway land. Improved farms, from $10 per acre up.

LABOUR.—Whites, $25 to $30 per month, good men; Chinese, $15 to $25, summer months; Indians, $1 to $1.50 per day. Indians in the preponderance; supply about equal to the demand; slight scarcity sometimes for a few weeks in harvest time.

Lower Thompson River Valley,

Including Ashcroft, Spence's Bridge, Lytton and Savona.

I group these all together inasmuch as they are all on the main line of the Canadian Pacific Railway, and being under the same climatic and other conditions, the excellent report of the Hon. C. F. Cornwall, correspondent at Ashcroft, answers for the whole region.

This district may truly be said to be unexcelled for the production of fruit of nearly all kinds; and although peaches have not, owing to the peculiarity of the climate, been a perfect success, I have no doubt that certain kinds, and in certain locations, may yet be successfully cultivated. With cheap freight rates and its proximity to the coast markets, this district would be able to supply all the tomatoes, grapes, melons and similar products that are consumed, to the exclusion of the California fruits. From recent discussions between the growers and the authorities of the Canadian Pacific Railway, there is, I am glad to say, an apparent disposition on the part of the latter to make more equitable rates, and it is hoped with the proposed reduction that a great impetus will be given to fruit-growing.

Timber is not abundant on the lower lands; there is, however, a sufficiency for farming purposes and fuel. On the hills, however, there is an ample supply. The principal timber trees are bull or yellow pine, Douglas fir and poplar.

ALTITUDES.—The valleys in this district are mostly between 700 and 2,500 feet above the sea level. The tops of the surrounding mountains are mostly from 2,000 to 5,000 feet above the sea. The district may be said to consist of round or sloping mountains, intersected by numerous narrow valleys of different altitudes, and containing more or less agricultural land. Small lakes and creeks are numerous in some parts. The mountains and valleys, up to an elevation of almost 2,000 feet, are covered principally with sage-brush, grease wood, wormwood, cactus, considerable bunch-grass in some places, and scattering yellow pine trees. Above 2,000 feet the mountain sides and valleys are almost everywhere covered with grass and scattering timber, pine and fir, the latter seldom very thick. Along the water-courses there is often a little brush, and many poplar and birch trees, seldom of large size. The country is nowhere thickly timbered.

I regret that, owing to absence of meteorological statistics, I am unable to give any definite information for 1900 on this important point. Previous statistics give it as follows at Spence's Bridge:—

Highest temperature (June)	104°
Lowest " (November)	-13°
Rainfall, one year, 2.44 inches, average	6.87 inches.
Snowfall "	82.08 "

Lytton is a small town situated at the confluence of the Thompson and Fraser Rivers. The ranches are situated in the valley of the Fraser, on both sides of the river, and are reached, those on the eastern side, by road and bridge across the Thompson, and those on the west by ferry. The altitude of the railway station is 687 feet, whilst the river is fully 100 feet lower.

Spence's Bridge, on the Thompson River, 22 miles above Lytton; altitude, 996 feet at the C. P. R. Station. Like the rest of this district, it is a famous section for fruit, but there is more land here for general crops and for pasture. The Nicola River empties into the Thompson at this point, and the waggon road to Nicola and Kamloops follows its valley.

Ashcroft is the point on the Canadian Pacific Railway at which the Cariboo Waggon Road takes its departure. It is situated on the Thompson River, about 26 miles above Spence's Bridge. The country around it, which includes Cache Creek, is generally open, with rolling hills, fairly well supplied with water for irrigation, but the channels of the large rivers are so deeply cut as to render the water unavailable. The altitude of Ashcroft is 996 feet (C. P. R), whilst that of Ashcroft Farm (Cornwall's), three miles distant, on the other or northern side of the river, is placed at 1,508 by Captain Parsons, R. E. The latter probably represents the altitude, approximately, of most of the ranches about here.

Savona is at the foot of Kamloops Lake, on the Thompson, 22 miles above Ashcroft. The country is open, with some scattered pine trees. The rolling hills afford good pasturage, for which purpose it is best adapted. Irrigation is necessary throughout all this region for the production of crops.

Report of the Hon. C. F. Cornwall.

This district, which for the purposes of the Department I am supposed to represent, lies along the valley of the Thompson River from the south end of Kamloops Lake for some thirty miles down stream. The river itself has worn its way deep down beneath the level of the immediate banks or terraces which confine it, has a severe declining gradient, and through the greater part of the distance rushes along at a great rate, with now and again a good deal of broken water. In years gone by an attempt was made to navigate it with the small stern-wheel steamers belonging to Kamloops and the upper waters of the river, but after a few trips the idea was abandoned, and has not again been revived. Now, indeed, that the C. P. R. runs alongside the river, the water carriage is not so necessary, although, were it feasible, it would doubtless be of great value as a competitor to the railway in the matter of the adjustment of transport charges.

The chief place in the district affording to the farmers any market, is the town of Ashcroft, which has sprung up since the completion of the railway as the starting place for the carriage of passengers and goods from the railway to the Cariboo and Lillooet districts, and the northern country generally. The population of Ashcroft numbers, perhaps, 500, and the business done there far outbalances, proportionately, such small numbers, for a considerable area of country is dependent upon it, and a great bulk of goods moves northwards from it. The town is well electrically lighted and supplied with excellent water by a company incorporated for such purposes, contains a branch of the Bank of British North America, some well supplied stores of a general, as well as several of a more specific, character, three churches, with their respective ministerial incumbents and supporters, and, generally, is as advanced as such a place can be. The immediate locale of the town is not attractive, lying low, as it does, in the trough of the river; but the people are prosperous and contented, the climate is charming, although the atmosphere is particularly dry, and many very passable roads lead in different directions to the surrounding country.

The absence of sufficient annual rainfall in this district leads to the necessity of irrigation for the satisfactory production of the usual grains and vegetables. This, of course, means that the amount of land which can be cultivated depends upon the amount of water which can be economically distributed over the country. The valley is naturally splendidly watered by streams whose source is in the enclosing mountains, but land will absorb a great amount of water, and such streams, though furnishing each from 200 to 500 inches of water, on a general average, throughout the irrigating season, are not sufficient in volume to irrigate more than from 100 to 500 acres each. All such streams have long been recorded and appropriated for irrigation purposes, and there remain only the waters of the great Thompson River itself and of two of its affluents, the Bonaparte River and Deadman's Creek, which are available for further supply. Could they be economically distributed over contiguous areas of land, there might be a largely increased agricultural population, with proportionately augmented production of all sorts; but much as I should like to see such works of utility under way, either in the hands of the Government or in those of private corporations (under adequate restrictions), yet I cannot help expressing a doubt whether the time has yet come for such enterprises. Speaking generally, one may say that there is throughout the world, under the present easy and rapid means of communication, a sufficient production and distribution of all the necessaries of life at very low rates, and, such being the case, it is difficult to see how (except under some special circumstances) agricultural productions can be made to pay where initial and working expenses are in any way above the average. On the other hand, irrigation, where the water can cheaply be brought on the land, pays highly for the extra labour involved in its application and distribution. That is shown by the exceptionally heavy returns of grain, hay, roots and all products from land sufficiently and intelligently irrigated. In this neighbourhood 40 bushels of either wheat or barley per acre is, in my experience, but an average crop, where the land is properly treated. Oats may run from 60 to 100 bushels. Hay, as may be supposed, with irrigation, will yield enormously, especially so the clovers, Alfalfa or Lucerne, and Sanfoin, while the ordinary fruits of all kinds, with but little practised attention in the way of treatment, are splendid alike in appearance and productiveness, and in quality. Vegetables of all sorts flourish, and tomatoes, melons, grapes, cucumbers, etc., ripen readily. Thus the land of this neighbourhood, owing to the rich quality of its disintegrated soils and climatic influences, is richly productive, where water can be brought on to it.

As I have above said, all easily available water has been long appropriated, under the specially suitable provisions of the local Statutes, and the places and properties so secure of water supply for irrigation purposes are exceptionally desirable possessions. Most of them are used in connection with ranges carrying more or less horned stock. For the latter there is easy sale in the Coast cities, and at present at remunerative prices; consequently, such properties as alluded to are held rightly at high figures. Several are in the market, but at a price. An intending purchaser of such must be ready to part with his money, but in exchange he can secure a property certain to yield a remunerative rate of interest, and one on which he can live with all the ordinary comforts of life, in pursuit of an out-of-door occupation of a most attractive kind. A trans-continental railway at his door will bring anything to him he may require, or is ready to carry his cattle to the best markets and himself whither he will.

In all this district there are numberless prospects of mines, with ore carrying copper, gold and silver. None of them have yet been developed, but the time will come when that will be done, and no reason exists why some should not prove of value equal to those in other parts of this heavily mineralised Province. The geological knowledge of the district that exists points to the probability of such being the case.

Public schools are conducted in the district on the same lines, of course, as in other parts of the Province. Wherever an adequate number of scholars can be gathered together, there is a school for their benefit.

And amusement and relaxation from work is by no means wanting. There is splendid trout fishing in the Thompson, extending over a long season; 3-pound fish are by no means uncommon, while heavier weights are continually recorded. Bright, strong fish, they afford wonderful sport in the heavy waters of the river. Many streams and lakes in the neighbourhood are also full of trout that rise well. There are still many big mule deer in the district and some mountain sheep, but winged game is scarcer than it should be. An effort is to be made now to secure the enforcement of the game laws. That is right and proper, but if private persons and the authorities would pay attention to the destruction of the innumerable vermin, winged and four-footed, which prey upon the game birds, still more benefit will accrue. I am inclined to ascribe the scarcity in this neighbourhood chiefly to the number of magpies and crows. Both species are very numerous and enormously destructive of eggs and young birds.

This is a very pleasant climate for camping out through the summer and autumn. Horse flesh is very cheap, and the animals can be cheaply kept, so what with the open country and numerous roads and trails, it is well suited to equestrian exercise. There is room for dozens of camping parties, who would be sure of a certain sufficiency of sport, and who would be captivated by the scenic beauty of the localities they would reach in the hills, mountains and higher levels of the country.

APPLES.—Duchess of Oldenburg, Wealthy, Haas, Gravenstein, Golden Russet, Ben Davis and many others are grown, of excellent quality and appearance. The yield in 1900 was average, and the fruit was well grown. I heard of nothing beyond the usual pests, such as green aphis, etc., and spraying was done in some orchards. Merely a local sale for fruit, and, therefore, difficult to quote any fixed prices, but I should say it varied from two to three cents per pound.

PEAS are not grown in quantity, though successfully in a small way.

PLUMS AND PRUNES.—No plums this year (1900). I fancy the exceptionally mild winter of 1899 and 1900 forced on the buds too much, and they perished some time or other. When spring came the fruit buds were gone, but one could see where they had been.

CHERRIES do well; good yield.

PEACHES, APRICOTS AND NECTARINES.—On the low benches on the Thompson River peaches succeed very well and yield heavily, the fruit being delicious. The crop of apricots is more uncertain.

GRAPES.—As with peaches, so with grapes; they are grown very successfully on the lower benches on the river. What are grown are saleable at remunerative prices.

WHEAT.—Although nowhere can better wheat be grown than in this neighbourhood, yet at the price paid by millers no one will grow it. The land may be better utilised in other ways.

OATS.—Everybody grows some oats, and many different varieties are under cultivation. Crops were very heavy in 1900, and were fairly well harvested. No diseases or pests. Average yield might be 70 bushels per acre, but I have no special means of verifying this. On one farm I know the yield, and have seen of weighed grain 100 bushels per acre all round! Prices, from $25 to $30 per ton.

BRANDING ROUND-UP OF CATTLE, NICOLA.

BARLEY.—Only grown in small quantities, and chiefly for home use. Heavy crops in 1900. No injury from weather, disease or pests. Average price, $30 per ton. If there was demand for malting barley, it might be grown to great advantage in this district.

BEANS.—Certain Chinamen alone grow beans, and they produce them in considerable quantities. Their value is generally too low to allow of their production here on white men's farms at the ruling rates of wages. The price is altogether regulated by that of the Californian article, and in that country they are grown in quantities to swamp the market. At present they are worth 2½ cents per pound—higher than usual.

POTATOES.—I believe the crop in this neighbourhood was harvested well this year. Many different varieties grown. Average yield in 1900, 400 bushels per acre. Weather propitious; in a few places slightly injured by the so-called cut-worm. Prices varied from $10 to $13 per ton. The potatoes grown in this neighbourhood have deservedly earned a Provincial reputation. Some 65 carloads (say 3,000,000 pounds) were shipped by C. P. R. in October; value, $17,250, or thereabouts.

TURNIPS.—Grown in small quantities for home use. Injured in October by innumerable small aphis-like pests, which clustered on crown and leaves of the turnip. (Turnip aphis—*Aphis brassicæ.*—J. R. A.)

OTHER ROOTS AND VEGETABLES.—All these only grown as garden stuff. All are very successfully grown in this district, but the yield in 1900 was hardly up to the average in either quantity or quality.

The chief pests in my experience are the cut and wire-worms. By the cut-worm I mean the ordinary one, not the grub or caterpillar which appeared late in the season in such extraordinary numbers. The former is only dangerous in the early spring, when it destroys rows upon rows of the young springing vegetables, eating them off just at the surface of the ground. The only remedy I find is hand-picking.

GRASSES AND CLOVERS.—For stock-feeding, Alfalfa and Sainfoin are chiefly grown, and are produced in great quantities. Timothy and Timothy and Clover are grown for stable use. Red clover and Alsike are grown. Good stable hay is worth $15 per ton. Timothy is certainly not a grass to be grown for general purposes. Practically—except under special circumstances—you get your crop of hay from it, and that is the end of its annual return. Austrian Brome grass I have not been able to grow here to advantage, nor do I know of any of it in the district. Further up the country, in the East Lillooet and Cariboo districts, I have noticed some good fields of it.

SMALL FRUITS.—Currants and raspberries of all sorts yield abundantly, the former with a profusion which can be excelled nowhere. I think the atmosphere is somewhat too dry for the perfect growth of strawberries. I am glad to draw attention to the excellent effect produced by spraying gooseberries in the early spring with liver of sulphur, to prevent mildew. I have here large gooseberries of English sorts. Some years since they used to mildew so badly as to destroy the crop; of late I have sprayed them with a mixture of the strength of one ounce of sulphur to 4 gallons of water, about five times each spring before the leaves break out; three or four days elapse between each spraying. This effectually prevents any but the slightest appearance of mildew, and the crops of fruit have been splendid.

BOARD OF HORTICULTURE.—I think the working of the Board is generally held to be useful and successful. With respect to fruit growing for market, I think that the only growers likely to be successful are those who give their almost entire attention to the work. They should be encouraged and protected in every way as far as possible; banishment of inferior fruits from the market, and the careful prevention of the importation of worthless or infected fruit.

DAIRYING.—Nothing appreciable done in this way, except for private use.

CATTLE.—The breeding of cattle is the industry of this district. The stock of cattle thrive, and year by year bring in to their owners considerable sums of money, much to the advantage of the whole neighbourhood. The principal owners are more careful than they were wont to be, and in most cases have winter ranges of considerable extent reserved for the use of their stock. I consider that the profits of cattle-raising are relatively greater than is the case with sheep, owing to the broken nature of the country and the number of wild animals which are a danger to sheep. The latter require too much looking after and shepherding to be remunerative. Many people have tried them on a large scale, but have always given them up after a few years' experience. The price of beef cattle has been high this year. There has been a great demand for fat stock, and the average price has been 3¼ to 3½ cents per pound, live weight. I consider the Shorthorn the breed par excellence. Other breeds have their recommendations, and are alternately in favour and demand for periods of more or less duration. The Shorthorn is always there—always in favour and demand. The operation of the "Cattle Ranges Act" used to be of great value to this neighbourhood. Now the major part of it is within the Railway Belt, and varied Dominion legislation on the same subject brings about a conflict of authority and a consequent desuetude of the application of that of either.

HORSES have certainly been more or less in demand during the past year. There is a scarcity of both good sizeable work-horses and of riding horses. Still, I feel confident that there is but little, if anything, to be made in breeding them. Most people who have tried it are of the same opinion.

SHEEP thrive well enough in this district, but are kept by but few people and only in small numbers. The reasons which militate against successful sheep breeding are the broken character of the country, the consequent difficulty of shepherding, and the presence of many wild animals which prey upon the sheep.

SWINE.—No quantity of pigs reared. They are worth perhaps five cents per pound on foot. At such a price there is no money in them, unless a farm is given up to their breeding and feeding.

POULTRY.—Not taken up with much system. Average price of eggs 25 cents a dozen; of chickens for food, $5 to $6 per dozen. No country, except one inhabited by a class of small farmers, living near together and on small farms, and, consequently, in comparative poverty, produces eggs in the quantity and at a price which allows of their collection for sale or exportation. This district has not yet reached that stage.

BEES are successfully kept in certain instances.

DISEASES.—I think the district is entitled to a clean bill of health with reference to diseases, whether contagious or otherwise, among animals. With cattle and horses reared in considerable quantities for many years, it is somewhat curious how exempt from trouble of that sort the district has been. The provisions of the Dominion "Animal Contagious Diseases Act" and the Provincial "Contagious Diseases (Animals) Act," which run on much the same lines, seem to me sufficient for the purposes intended. In such matters so much depends upon the law-abiding integrity of the owners of stock, and the capacity of inspectors and veterinarians, that to them we must look for the successful operation of the Acts. Experience has shown the danger of too hastily accepting as reliable certain tests of disease, or exemption from such, and, as in other matters, so in this much depends upon those appointed as experts or acting officials under the Acts.

CO-OPERATION.—Farmers are too scattered here for effectual co-operation, and but little movement of produce, with the exception of potatoes and beans, is attempted.

COLD STORAGE.—The stock fit for slaughter in this district is so easily disposed of at suitable times that there has apparently arisen no necessity for cold storage warehouses. The C. P. R. runs right through the district, and, this being the nearest stock-breeding district to the Coast cities, it has, as it were, the first opportunity of disposing, at any time of year, of anything fit for slaughter, and consumers naturally prefer fresh meat to that kept for months, however successfully.

EXPERIMENTAL STATIONS.—Living in one of the districts of the Province where irrigation is necessary for the completely successful production of crops, it has always seemed to me that an experimental farm in such a district would be a very desirable and useful institution to be maintained by the Dominion Government, within whose province, I think, such work lies. No institutions could have better demonstrated their value than have the several Experimental Farms of the Dominion Government, but they are all situate in parts where farming is carried on under ordinary conditions. Surely there is a wide field for the institution of one such farm, to be cultivated under the interesting and comparatively ill-understood conditions of artificial irrigation.

IRRIGATION is absolutely required for the successful production of crops in the valley of the Thompson, and is carried on everywhere through this district where water is easily obtainable by gravitation. To an extent limited by the number of running streams, the facilities of irrigation are considerable. The soils and sub-soils are, as a rule, well adapted for the purpose, and in almost every case the gradual slope of the land to be irrigated, free from depressions or folds in the ground, lends itself very satisfactorily to the necessary laying out of such lands. Unfortunately, such is the character of the streams available for irrigation that, in most cases, it is impossible to conserve the water. The streams all come from the high mountains enclosing the valley on either side, and have cut so deeply the channels down which they pass that there are no natural level spaces, to flood which the streams might be dammed and the water held back till required for use. Many thousands of acres might be cultivated if water could be brought on to them, but they are all in scattered blocks of small individual extent, and I fear that the cost of providing a sufficiency of water (which is obtainable) would be great. The carrying of water in canals or ditches along the sides of the loose, gravelly hills which enclose the valley is a risky operation, while the expense of taking it in pipes is, perhaps, prohibitory. In one case, however, the water of the Bonaparte is pumped, to irrigate a tract of 200 acres or so, by electric power generated for the use of the Ashcroft Improvement Co., which supplies the town of Ashcroft with water and light. A powerful pump was installed last spring, and for a time easily supplied the necessary volume of water. It, unfortunately, broke down, and has still to be replaced. I hope the experiment may succeed, although, as the land is leased to Chinamen, one can hardly regard the enterprise as one of great advantage to the neighbourhood. After this pump broke down last summer, there was so much natural rainfall that further irrigation was unnecessary, and so, fortunately, no damage accrued to the crops grown.

WEEDS.—I do not know of any appearance of the Canada thistle in this neighbourhood. Weeds, generally, are increasing in number, being evidently introduced with grain or other seeds from other localities, but I know of none sufficiently troublesome as to need report.

ENTOMOLOGICAL.—A sort of aphis, in the latter part of the season, did much harm to cabbages, cauliflowers, Brussels sprouts and turnips. They attacked the plants in great quantities, and, remaining upon them, effectually prevented any further growth. In some parts there were many grasshoppers. I fear they will be numerous in the coming year.

CUT-WORMS.—This district escaped better the ravages of these so-called cut-worms than most others in the Province. They certainly did damage in places, both to garden stuff and to the second crop of clover, which at the time of their presence was nearly ready to cut. They were present and active for about two months, July and August, and perhaps into September. I have not been able to find anyone who noticed any abnormal quantity of moths about afterwards, and whether any laid eggs or no I can't say; I was absent during the time they would probably be doing so. They may rightly be called "cut-worms," perhaps, but their methods of destruction are by no means similar to those of that old and well-known pest, the ordinary cut-worm which appears in spring.

NOXIOUS ANIMALS AND ANIMAL PESTS.—Curiously enough, panthers, which a few years since were absolutely unknown here, are now comparatively common. Difficult to say whether they have been disturbed and driven from their haunts west of the Cascades, or whether they have been attracted here by an increase in the number of deer. Now that the bounty on coyotes is increased to $2, I consider the amount quite sufficient.

FOREST FIRES.—No forest fires in this district, such as there used to be in earlier times. Then they were, undoubtedly, purposely caused by the natives, with the object of burning off the old grass, which otherwise was not touched from year's end to year's end. In consequence, cottonwood and other deciduous trees have sprung up in many places where formerly there was nothing of the sort, so continuously was the ground burnt over.

LANDS.—This district lies within the so-called Railway Belt, and the unalienated land is within the control of the Dominion Government. That Government charges $5 per acre for it, reserving to themselves almost everything of any value except the actual surface! Such land is chiefly of a pastoral character, almost all available localities for farms, where irrigation can be carried on, being occupied. I can give no average price for improved farms. Almost every farm is used as an adjunct to stock breeding, and is invariably held at a considerable figure.

LABOUR.—Whites, very scarce; wages, $25 to $40 per month. Chinese, $20 to $25 per month, or $1 per day; Japanese, $20 to $25 per month, or $1 per day; Indians, $20 to $25 per month, or $1 per day; $1.25 in hay or harvest time. Labour for temporary purposes is often hard to obtain. There are more Chinese and Indians available than of any other class. Whites have been specially scarce this past season.

Report of J. A. Teit, correspondent, Spence's Bridge:—

SOIL is mostly a sandy loam, but in some places consists of clay sub-soil, in some places gravel, and in others clay.

Peas.—Most of the peas in this district are grown by Indians on their reserves. Ruling price, $1.25 to $1.50 per 100 pounds.

Beans.—Nearly all the beans are grown here by Indians on their reserves. Ruling price, $1.25 to $1.50 per 100 pounds.

Grasses and Clover.—Sainfoin, Clover, Timothy and Alfalfa are grown. The first three are cut in most places twice in the season, and Alfalfa often three times. Many of the wild grasses are very good. Austrian Brome grass has not been properly tried.

Indian Corn grows exceptionally well here, but is very little used for fodder.

Apples.—The yield was large. Price, about $1 per 40-pound box.

Other fruits yielded well, and all succeed.

Grapes grow well, but most of the vines are poor varieties. Some varieties are very saleable. The varieties grown in the East are practically unsaleable.

Small fruits.—All varieties grown. Strawberries do not do so well as the others.

Horned Cattle.—Successful industry. Shorthorn and Hereford principally raised. Pastures would soon be depleted if run with sheep. Native grasses, in most places, cannot stand too close cropping or too much trampling. Beef, about 8c. per pound; milk cows, about $35 to $40.

Irrigation is an absolute necessity. If water were available more land would probably be cultivated in some places.

Timber.—In the lowest parts of the district—in dry places, yellow pine; along streams, etc., maple and cottonwood. In the lower mountains—in dry places, fir and juniper; in damp places, cottonwood, alder, maple and willow. In the higher mountains—in dry places, black pine and nut pine; in wet places, spruce, willow, etc.

Poisonous Plants.—The wild parsnip sometimes poisons cattle here, but only one variety of it.

Cut-worms last year of a kind hitherto unknown, or at least unnoticed.

Cariboo Waggon Road,

Including all points between Ashcroft and Quesnel, the principal of which are Clinton, Bridge Creek, Lac la Hache, Williams Lake, Soda Creek and Alexandria. All of these points are connected by stage—three times a week—with Ashcroft, the point of connection with the Canadian Pacific Railway. Clinton is situated 32 miles from Ashcroft, at the point at which the Lillooet and Big Bar Roads leave the main waggon road.

The following altitudes are given by various authorities:—

Cache Creek, about	1,500 feet.
Hat Creek	1,686 „
Clinton	2,973 „
Bonaparte Valley, "The Mound"	2,144 „
Bridge Creek and Lac la Hache	1,800 „
Soda Creek Crossing	1,690 „
Fraser River, at Alexandria	1,420 „
„ Quesnel	1,490 „

Meteorological statistics are not obtainable, except at Quesnel, for 1900:—

Highest temperature (July)	90°
Lowest „ (February)	-22°
Rainfall	14.38 inches.
Snowfall	30.5 „

Mr. F. W. Foster, correspondent, Clinton, reports as follows:—

General Description.—Seeming inaccuracies must occur in any report from this section, caused by sudden changes in the altitude of farms. For instance, 7 miles from Clinton to Wm. Saul's is a fall of 800 feet, and from Clinton to E. Dougherty's, 11 miles, of 700 feet. In Clinton Valley wheat cannot be raised as a reliable crop suitable for milling, while at the

NICOLA RIVER.

two farms above mentioned a good marketable grain can be grown, as also a good quality of apples. The latter have been tried in the Clinton Valley and freeze. As a general crop, only feed for horses and cattle is raised, such as oats, barley, timothy, clover, sainfoin, red-top, beets, potatoes, carrots, and the general run of hardy vegetables.

OATS.—The early varieties do best. The average yield is 1,500 pounds to the acre. No pests except a few chipmunks and squirrels. Ruling prices, $38 to $40 per ton.

BARLEY.—All kinds of barley grow well. There is very little grown, as there is small demand; used only for feeding team mules. It is about two weeks earlier crop than oats.

ROOTS AND VEGETABLES.—Potatoes are generally a good crop and average 1c. per pound. Other roots and vegetables are only grown for home use and feeding.

AUSTRIAN BROME GRASS.—Personally, I may say, after a fair trial, I conclude it is the worst grass I have had sown. In other places in the district there are reports that it gives 2½ to 3 tons of hay to the acre.

FRUITS.—At 3,000 feet apples freeze out. Going out of this valley to the lower ones, such as Bonaparte and Fraser, they do well, at altitudes of say 700 to 1,000 feet lower than Clinton. This may also be said of other large fruits.

SMALL FRUITS.—Gooseberries, currants and raspberries yield well. The wild raspberry is much preferred, as being better flavoured, and can be had with little trouble, all at about 10c. per pound.

DAIRYING.—The nearest place to Clinton Valley for dairying is Lac La Hache. They have no creamery as yet. Private farmers produce a good article of butter, which is readily bought up. A large creamery should do well, as at present the bulk of the butter used is imported for the Cariboo trade.

FEEDING.—Oat straw and swamp hay, both salted, is the general feed.

HORNED CATTLE AND SHEEP.—Sheep eat out the ranges and do so much harm to the cattle-raiser that raising them in any quantity in our mountains has long ago been vetoed by cattle men. As to price, a 2-year-old steer, in some localities, is as heavy as one of 3 years at unfavourable places, where the winter is longer, and vary from 15 to 25 per cent. The soil is too light for wild grasses, and after sheep go over it a few times the ground is as bald as a desert, and grass does not come again for several seasons.

HORSES.—Few ranchers around here raise horses with any particular profit, chiefly from want of large, safe enclosures. If any get outside the limits of the small enclosures, they join the wild bands and cost as much as their value to catch. No one has made a specialty of it here.

COLD STORAGE, no doubt, would be a good thing at Ashcroft, provided butchers in the lower country could be persuaded to patronise it. At present the cattle buyers are few, probably four only, who supply the Coast markets, and if they would co-operate it would be a good thing.

SOILS.—We lack vegetable mould; our soils are moraine, the remnants of the glacial period; but by irrigation and average seasons, we raise fair crops.

IRRIGATION is necessary through the whole district. Land is more plentiful than the water to irrigate with, unless at immense expense. There are very few blocks of land of sufficient size to warrant any large outlay.

POISONOUS PLANTS.—We have water-hemlock, or wild parsnip, as occasionally fatal to cattle in the spring; also *taxus*, *rhus* and *delphinium*, but from the latter have not heard of any trouble.

NOXIOUS ANIMALS.—The panther is certainly increasing and the herds of deer diminishing. We had no panthers until about eight years ago. I suggest that the present bonus on coyote ears of $2 should include the whole pelt, or with justice make it $2.25. The ears or pelt should then have a small hole punched for a Government mark, and the skins sold by the Government or some local agent appointed. As it now is, the pelt minus the ears is worth 25 cents, while the whole skin is worth in the New York market $2 to $2.25, and the adoption of my suggestion would save the Government a large amount.

FOREST FIRES.—Carelessness is probably the cause of most fires, but it would be hard to prove. A man throws away a lighted match after lighting his pipe, and if he sets the forest afire he won't confess. However, lightning does a lot of incendiary work, although it seldom sets fire to the tree it strikes.

LABOUR.—Whites, from $25 to $35 on farms; Chinese, $25; Japanese, none; Indians, $25 to $30 per month.

Bridge Creek and Lac la Hache, the former about 85 miles from Ashcroft, and the latter 100 miles. The road, shortly after leaving Clinton, enters what is known as the green timber, an elevated plateau covered with pine trees, mostly of stunted growth, with here and there small ponds and swamps, all highly impregnated with alkali. With few exceptions, the country is indescribably dreary and generally worthless. One of these exceptions is the 70-Mile House, kept by Wm. Boyd, who has a good dairy farm. At Bridge Creek the road descends into the valley of that stream, and thence along Lac La Hache, and the character of the country changes, for the better.

ALTITUDE —Bridge Creek is placed at 3,086 feet by Captain Parsons, R.E.; Lac La Hache at 2,488 feet, and the same authority estimates the 70-Mile House at 3,300 feet. Sandford Fleming gives the altitude of Lac La Hache at 2,682 feet, and which is probably nearer the mark.

Timber is plentiful everywhere for all purposes of the ranchers, and of water there is no lack for purposes of irrigation. Barley, oats, rye and hay give good returns, and are extensively cultivated to supply local demands. Root crops are also good, but large fruits are not grown. Cattle are produced in large numbers for beef and dairying. The latter industry, for which this part is well adapted, has some attention paid to it here, and a considerable quantity of butter is produced. A good many horses are reared, and a few sheep and pigs.

Quite an extent of good land lies in the vicinity of Williams Lake, One Hundred and Fifty-Mile House and Chimney Creek. A road leads from the One Hundred and Fifty-Mile House, on the Cariboo Waggon Road, past Williams Lake to the mouth of Chimney Creek on the Fraser River, at which point there is a good ferry, and by swimming horses access is had to Chilcotin. Another road, which branches off at Williams Lake, leads down the Fraser past the Spring House Ranch to Alkali Lake. The country along this road is very beautiful, but on account of the altitude, which is from 1,750 to 3,500 feet, practically nothing is raised with the exception of hay, stock-raising being exclusively carried on. About Williams Lake, however, all the ordinary cereals and roots are successfully grown, and a good market is always obtained at the Cariboo mines.

Soda Creek and Alexandria lie along the Fraser River and the Cariboo Waggon Road. The valley of the Fraser, above Soda Creek, widens out considerably, so that the ranches are much nearer the level of the river than they are lower down. Most of the ranches are on the eastern side of the river, on the Cariboo Road, some of them very fine ones, notably, the Australian and Bohannon's, beyond Alexandria, where extensive and profitable operations are carried on. On the western side, above Alexandria, are also some large and fertile farms, including that of Mr. Adams, upon which very heavy crops of cereals are grown. The former is 165 miles, and the latter 185 miles, from Ashcroft.

The following is the report of Mr. P. C. Dunlevy, correspondent, Soda Creek :—

GENERAL DESCRIPTION.—The general nature of the country is hilly. The timber is mostly fir, with some cottonwood. The soil is sandy, clay loam ; the ranches are mostly on the benches along the Fraser River.

WHEAT.—There is considerable fall wheat raised, especially by P. C. Dunlevy. The yield this year was about 45 bushels per acre ; the frost did not damage it at all. The wheat is mostly ground into flour, as there is not much sale for wheat. Of spring wheat there is considerable grown on all the ranches. It is mostly all ground at Soda Creek and Quesnel mills ; what is not ground is used for hog and chicken feed. The ruling price is about 2 cents per pound. The fall wheat grown at Soda Creek is mostly Canadian ; the spring wheat is Australian white. On the other farms it is Canadian Red Fife.

OATS.—Yield about 60 bushels to the acre. The average price was 2½ cents per pound. There is nothing bothers the oats in the shape of worms or grubs, but occasionally there is a little smut. We find, however, that by blue-stoning the wheat and oats we are not troubled with it.

BEANS.—None produced except for home use, but I think that they could be grown and would yield well.

POTATOES succeed well, and produce about 500 bushels per acre.

OTHER ROOT CROPS not produced to any extent.

ONIONS about 300 bushels per acre. Yellow Danvers are the kind generally raised.

CLOVER AND GRASSES.—Clover, Timothy, and Alfalfa for dairies. Clover and Alfalfa are the best, but it is only in the last few years that the Alfalfa has been raised. Mr. Wm. Adams is the only one around here who has raised any of it. He had a yield of 4 tons per acre in two cuttings, per season.

Bromus Inermis.—Mr. Adams, of Springfield, raised some, but not successfully.

Native Grasses.—Wild tare is the only native grass in this neighbourhood. Cattle seem to do quite well on it.

Apples.—A few raised, with moderate success.

Pears.—Do not know of anyone who raises any. Mr. Dunlevy has a few trees set out, but it is too soon to say how they will do.

Plums and Prunes.—Mr. Collins raised some plums successfully.

Small Fruits.—Strawberries, currants and gooseberries are successfully raised.

Dairying.—There are no co-operative creameries in the neighbourhood. There are quite a number of private dairies; all seem to do well.

Horned Cattle.—The cattle industry pays well. The price of cattle ranges from $30 for 2-year-olds to $50 for 4-year-olds.

Sheep.—It would be a profitable industry if carried on to any extent. One reason that they are not more generally raised is that they spoil the ranges for cattle.

Swine.—The raising of hogs is profitable; nearly all ranchers raise a few. The leading breed is the Berkshire. Average price on foot, about 10c. per pound.

Poultry do quite well, but don't know of anyone who makes a business of raising them exclusively. All farmers raise from 50 to 100. Eggs sell at 50c. per dozen.

Diseases of Animals.—No disease of any kind among the cattle in this part of the country.

Cut-worms raised the mischief last season; destroyed potatoes, cabbage, tomatoes and all garden stuff in some parts of the country; in other parts did no damage at all.

Noxious Animals.—Do not consider that the bounty on coyotes is sufficient; should be at least $2 per head. (Since raised to $2.—J. R. A.)

Labour.—Labourers are procurable at from $25 to $35 per month for whites, and from $15 to $25 for Chinese. White labourers are scarce; plenty of Chinese and Indians, but no Japanese. Chinese preponderate over all other classes.

Valley of the Upper Fraser,

From Lillooet to Alkali Lake, and including, besides the two places mentioned, Pavilion, Big Bar Creek, Empire Valley, Dog Creek, Gang Ranch and Chilcotin.

This part of the country, being off the main Cariboo Waggon Road, is devoted extensively to stock raising, as the expense attached to the transportation of general crops is too great to admit of general production. They, however, do well, and all demand is supplied with all kinds of produce.

Alkali Lake and Dog Creek are on the east side of the Fraser River, on the road which branches from the Cariboo Road at 150-Mile House and runs along the Fraser to the vicinity of Big Bar, where it leaves the river and joins the main road at Clinton. The Canada Western Company's property, called the Gang Ranch, is on the opposite side of the Fraser River, on Gaspard Creek. Chilcotin and Empire Valley are also on the same side.

Lillooet and Pavilion are below Big Bar Creek, on the river road. Lillooet includes Pemberton Meadows and what is known as the Douglas Portage, that part between Port Douglas and Harrison Lake and Lillooet, on the original Cariboo Road. Lillooet, when the trail went that way, was a place of some commercial importance, but since the present Cariboo Road was built, much of its early prosperity has been taken away from it. It is situated on the western side of the Fraser River, which is here crossed by a fine bridge, giving access to the road leading to Pavilion, and thence over Pavilion Mountain to Clinton, or through the Marble Canyon to Ashcroft, on the Canadian Pacific Railway. Another road, recently constructed, leads down the Fraser to Lytton.

Pavilion and Pavilion Mountain includes all the country on the east side of the Fraser, Marble Canyon, as well as that on the mountain, which is at an elevation of some 3,000 to 3,500 feet, increasing until it reaches about 5,000 feet. Communication is maintained by good waggon roads to Clinton over the mountain 21 miles, with Lillooet 17 miles, and Ashcroft, through the Marble Canyon, about 36 miles.

Altitudes given by various authorities are as follows:—

Fraser River, at Lillooet	700 feet.
Seton Lake	802 〃
Pemberton Meadows	695 〃
Pavilion	1,357 〃
Pavilion Mountain	3,500 to 5,000 〃
Fraser River, at Big Bar	1,200 〃
〃 Alkali Lake and mouth of Risky Creek	1,350 〃
Risky Creek, Chilcotin	2,170 〃
Chilcotin Valley, average	2,625 〃

Mr. R. Carson, Pavilion Mountain, reports:—

There is only a limited amount of land to be had in Lillooet District fit for farming. This makes prices better for those engaged in general farming.

CATTLE.—Beef is the best-paying article for sale here, good two-year-old steers bringing $30 to $35 readily during the summer. The Coast buyers buy beef here, and some of it goes to the mines of Lillooet.

CEREALS.—Oats sell at 2c. per pound; wheat, 1½c. at Pavilion flour mill. There is little barley grown.

HORSES.—Good work horses bring from $100 to $150. Very few good animals are raised here; what are on the ranges are principally Indian cayuses. Some of them make good riding animals, but they are too small for military purposes.

DAIRYING.—On Pavilion Mountain there are some good farms, and it would make an excellent place to start a creamery, but old-time habits and poor cattle for dairying purposes are against a creamery at the present time. There are only two dairies in operation. That the one on Pavilion Farm is a success, results so far prove. Good butter is in demand at 30c. per pound.

LABOUR.—Wages are extremely high, from $25 for Chinese help to $35 for Indian and white help during the summer. British Columbia needs a better class of farm labourers. The mines, mills, fisheries, etc., offer high wages for a part of the year, and this has a tendency to lessen application for permanent work on the farms. Were it not for Indian help, people up here could not save their crops at any profit at all. Men are scarce in summer.

The following is the report of Mr. J. N. J. Brown, correspondent, Empire Valley:—

GENERAL DESCRIPTION.—Empire Valley is situate on the west side of the Fraser River, some 105 miles from Ashcroft Station, the nearest railway. Ashcroft is its nearest banking town. The country is chiefly a grazing section, with prairie land, well watered and well timbered. Large numbers of cattle are annually raised. Grain is also extensively carried.

WHEAT is grown, ground for flour, and also used for feed. Smut prevalent during the the last two years, due to carelessness. Ruling price, 2c.

OATS are grown in quantities, and gave good yields in 1900. Ruling price, 2c., but was down to 1½c. per pound.

OTHER GRAINS not grown to any extent.

ROOT CROPS..—Potatoes fetch from 1c. to 1½c. per pound; other roots used for feed.

GRASSES AND CLOVERS.—Timothy I consider the best feed for work horses; I found this out while I was driving stage. Sainfoin and Timothy, mixed together, make good horse-feed. Other grasses, of a softer nature, are better for cattle. Bunch-grass is, in my opinion, the best wild grass in our section; I don't think there is any other to equal it (*Agropyrum divergens*—J.R.A.) Austrian Brome grass has not succeeded here.

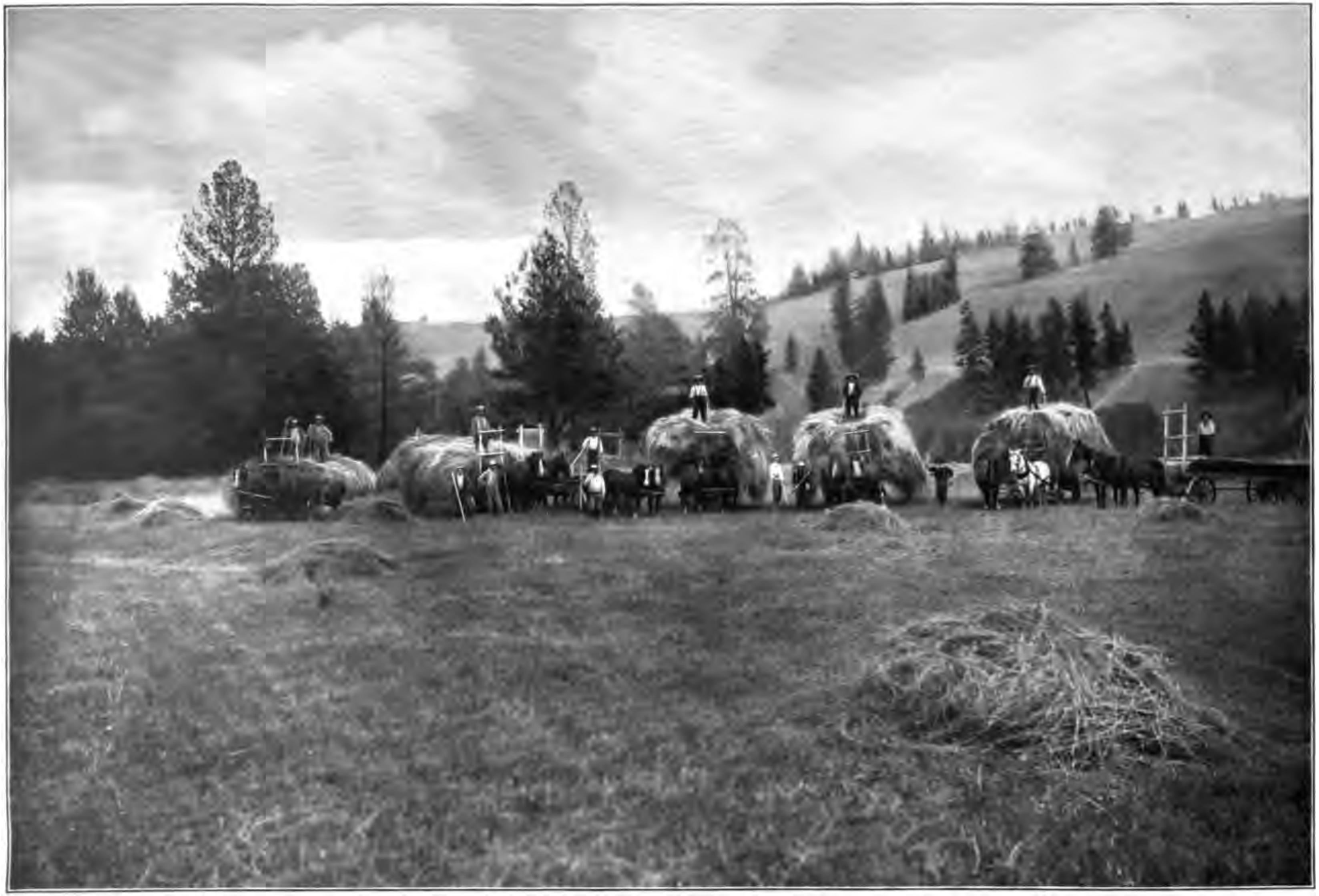
APPLES are successfully grown at McEwen's, Empire Valley, and also at Lesser Dog Creek, Alkali Lake, Big Bar and Dog Creek.

OTHER FRUITS.—Plums and cherries are successfully grown in places, and probably pears would succeed well if properly tried. Small fruits all do well.

OATS.—Mostly Siberian; about 2,000 lbs. to the acre. Ruling price, $2 per 100 lbs.

ROOTS AND VEGETABLES.—There is a great quantity of potatoes successfully grown, for table use and hogs. Other roots and vegetables can be successfully grown, but are not produced except for home use.

GRASSES AND CLOVERS.—Timothy is the principal grass grown and made into hay for feeding stock. Austrian Brome grass is only being tried.



SCENE AT DOUGLAS LAKE, NICOLA.

HORSES.—The horse industry has been quite profitable, and there has not been any over-production. A cross between the Clyde and Percheron I consider best. Horses have fetched a much better price this year than the past few years.

SHEEP.—It is the best sheep country in British Columbia. There are no large bands kept in this part. I believe it is a very profitable business. I recommend Shropshires. Ruling prices, $6 per head for sheep and $5 for lambs. Wool is not sold, as it is too far from the market, and not enough of it to pay for the shipping.

SWINE.—There is a great number of pigs raised here. They are nearly all bought up by Chinamen miners; they pay from 5 to 6 cents per pound on foot. The balance are killed and turned into bacon for home use. The Berkshire is the only breed here.

IRRIGATION is required for the successful production of crops. It is carried on to a considerable extent; the soil is of a favourable nature for the purpose. There is plenty of water available. Ditching costs about 75 cents per yard.

NOXIOUS ANIMALS.—I think that the bounty on coyotes might be raised to $2, as they are increasing. (Now raised.—J. R. A.)

LANDS.—There is unlimited Government land which would make good farms. It is mostly all located in the heart of the settlement, land that would raise any kind of a crop. Improved farms can be bought, but fetch good prices.

LABOUR.—Whites, $1.50 per day, or $30 per month. Chinese, $20 per month, as cooks. Indians, $1.50 per day. There is always a scarcity of white labour.

GRAPES.—The only place where grapes have been grown with success is at Big Bar—just grown in the garden. There are places along the river banks where, I think, grapes could be grown with success; for instance, at the mouth of St. Mary's River, commonly known as China Creek. There would be a good market for this product.

BUTTER, as a rule, commands good prices, but farmers take no interest in the matter.

HORNED CATTLE.—Cattle raising is the most successful industry in this district. Thousands of dollars are yearly derived from cattle. The "Cattle Ranges Act" is very good, but bulls should not be allowed to run at large till the first of July. Durhams are best for beef. Price, $45 for three-year-olds.

SHEEP I would not recommend, especially among cattle. Sheep eat up the grass (bunch-grass), and it never grows again.

HORSES are in greater demand now than formerly. Heavy draught horses are always in demand. There are many wild horses at large that are a detriment to the district. Percheron horses, for general purposes, would be the best breed.

COLD STORAGE established at Ashcroft would be of great advantage to the Province at large. I think the Government should assist the farmers in this matter.

IRRIGATION.—Without irrigation crops would be a total failure. There are large tracts of land that could be utilised if water could be obtained, but this is a difficult matter.

POISONOUS PLANTS.—Water hemlock (*cicuta*) grows along our creeks. One Chinaman was known to die at Dog Creek from using it for a toothache. Poison ivy grows along the sandy banks of the Fraser. Poison onion is very plentiful all over the country.

ENTOMOLOGICAL.—Cut-worms were bad last year, and did a great deal of damage to root crops and vegetables.

LAND.—There are many acres of Government land open for pre-emption, but in most all cases lack of water is the drawback. Improved land here is mostly stocked with cattle; therefore, prices are high.

LABOUR.—Whites, $35 per month, summer time; Chinese, from $15 to $25; Indians, from $1 to $1.50 per day. The supply is equal to the demand.

In Chilcotin is included all that section lying on the western side of the Fraser, between Soda Creek and Chilcotin River, a distance of about 40 miles, and running back about the same. It is but sparsely settled, the country being principally adapted to stock-raising; in parts, however, good crops of grain and roots are obtained, although the general altitude is unfavourable to mixed farming. According to Mr. Sanford Fleming, the average altitude of Chilcotin Valley is 2,625; of the plain, 3,411; of the Chilcotin Lake, 3,150; of old Chilcotin Fort, 3,800; and of the foot of Risky Creek, 2,170 feet; the Fraser being in the neighbourhood of 1,400, giving some idea of the climb necessary to attain the level of the plain above. The crossing at Soda Creek is effected by a good wire-rope ferry, whence there is an excellent road through Chilcotin proper; another crosses Chimney Creek, and is effected by boat and swimming horses; the latter route is a great saving of distance, for settlers living on Chilcotin River and valley, in reaching the Cariboo Waggon Road. Risky Creek, above mentioned, empties into the Fraser a few miles above Chilcotin.

The following is the report of Mr. Charles Crowhurst, correspondent:—

GENERAL.—The soil is bottom land and bench bunch-grass. The market is mostly Cariboo, reached by waggon road. There are neither mines nor school. There are game and fish of all kinds. It is one of the best stock countries of British Columbia.

WHEAT.—Grown for milling. About 2,000 pounds to the acre is the average. Prices, $2 per 100 pounds for wheat; $5 per 100 pounds for flour.

Northern Portion of the Province,

In which is included all that part lying between Quesnel and Atlin, a vast extent of territory practically unsettled, except by miners and prospectors, and embracing within its limits the district of Nechaco, regarding which, having no personal knowledge and having been unable to secure any fresh information, I reprint that given in the last report. A telegraph line is now in operation through this district, and as far north as Dawson, in the Yukon. The following are the meteorological reports for 1900:—

AT BARKERVILLE (in mountains).

Highest temperature, July	86°
Lowest " February	-26°
Rainfall	25.45 inches.
Snowfall	141.6 "

STUART LAKE.

Highest temperature (July)	81°
Lowest " (February)	-38.6°
Rainfall	9.04 inches.
Snowfall	35.8 "

The following is the report alluded to:—

Many inquiries have been made about the Nechaco District, and, consequently, all the information possible has been obtained from all sources. The information is somewhat contradictory, and without personal and definite knowledge of the conditions which exist there, it is impossible to give advice as to its desirability as a place for settlement. That it is a good summer stock range is unquestionable, and from all accounts, there seems to be every reason to believe that a sufficiency of fodder can be produced from the natural meadows to winter stock. Its northerly position (about 54.10 N. and 124.10 W.) and its altitude, probably between 2,000 and 3,000 feet above the sea level, would naturally render it somewhat uncertain for the growing of grain crops. Still, with cultivation and drainage, it may be susceptible to great improvement in the matter of summer frosts, which has been experienced in other places with similar characteristics. In any case, situated as it is, it is evidently not a country suitable for a man with a family and small means, and unless a settler is willing to live in an isolated condition, without any immediate prospects of roads, bridges, schools, postal facilities and other adjuncts of ordinary living, he is not advised to attempt it at present. If a colony of 50 or more were to settle there, it would be somewhat different, as conditions would be altered and the lack of facilities referred to would naturally soon be obviated. The present isolated situation is undoubtedly the reason that so few settlers have thus far taken up lands there. With railway communication, however, and access to the mines of Cariboo, many of the real or alleged difficulties in existence there would no doubt soon disappear, and a very large area of pastoral and agricultural lands would be added to the wealth-producing power of the Province.

In answer to inquiries, the following letter was received from Mr. H. S. St. Laurent, Mouth of the Quesnel:—

Mr. Bowron has requested me to give you a description of the Nechaco country, with reference to its capabilities for agriculture. I am not competent to give the required information. I have asked Mr. Williams, who has a ranche in the valley, and who planted some grain and vegetables this spring, and he has been good enough to give me the enclosed information. He mentioned L. A. Poudrier, D.L.S., who surveyed that valley, and he thinks that he made a correct report to the Government (*see* the maps and report of 1891). The best route to reach Nechaco is by way of Quesnel. It is only 110 miles from here and on a good trail. The trail could be made a sleigh road at very little expense. The Blackwater River and Mud River would require to be bridged. The drawback to that country is that there is no market for produce. The Indians at Stoney Creek are raising as good vegetables as we do at Quesnel. I was told that at Fraser Lake the H. B. Co. are raising oats and vegetables as good as in any part of British Columbia.

The following is Mr. J. F. Williams' report:—A report on the Nechaco country, a general description of the country, such as the soil, water, timber, capabilities for agriculture and pastoral purposes, altitude, climate, summer frost, the possibility of grain-raising and vegetables, any swamps to make hay, the time the spring opens. In regard to the above questions, I will answer as far as I know. Spring begins about the latter part of March and the first of April. The soil is very rich and productive.

All root vegetables grow in abundance; berry fruits grow immense. I have never seen a better oat and barley crop grow as I had on 9 acres last year (1895). I am told there had been good wheat raised by the H. B. Co. some years ago. It is subject to summer frost more or less, but no more than other localities in British Columbia, where they raise good grain. Good water is plentiful over all the country. Heavy timber is not so plenty, only in the foothills.

Small timber grows over all the country, cottonwood, birch and black willow; the feed and grass is growing over the whole country, but it could not be called a first-class stock country, though there are plenty of large swamps that make fine hay meadows.

There could be a first-class waggon road made with little expense from Quesnel to Nechaco, that would be about 110 miles; a good trail and right of way is already made from this point to Nechaco, and the winters are not severe on stock, as they winter through without hay most winters. I am able to say, moreover, that I am going back this spring to seed ten acres more and break about forty acres more new land and improve some more. Anyone to read Mr. L A. Poudrier's report about the country will find that he describes it very truthfully. There is as fine water power of a good many thousand inches as a person could wish for just about the centre of the country, viz., the Stoney Creek Falls, about a mile and a half from the Nechaco River. The country in the vicinity of the Falls is comparatively level, and it could easily be farmed; the soil is very rich, with a heavy growth of grass and hay.

Mr. R. Borland, of the 150-Mile House, writes as follows:—Yours of the 27th ultimo to hand and contents noted. In reply, may say in my opinion that the Nechaco is only fit for stock-raising to a limited extent. I do not think grain of any kind can be raised successfully. There is liable to be ice any day in the year. I saw ice at the crossing of the Nechaco River a quarter of an inch thick in July and August one season. I think there is about twenty square miles of grazing country between Nechaco and Chilcat Lake, Chilcat Lake being about 125 miles from Quesnel Mouth, which is the nearest market.

Mr. Donald Walker, of Anderson Creek, Kamloops, writes:—I spent four years in that part of the country; at Fraser Lake I have seen and eaten as fine potatoes as could be wished for; wheat will mature there also. Professor Macoun, of Ottawa, expressed his opinion to me in 1875 that it would be a good country to settle in.

The following is from Mr. R. H. Hall, manager of the Hudson's Bay Co. at Victoria:—

J. R Anderson, Esq.,
Deputy Minister of Agriculture, Victoria:

Sir,—I am in receipt of your letter of the 30th ult., in reply to which I will be glad to give you any information I have in regard to the Nechaco country.

I would think that the season is too short in the Nechaco country to do much good in agriculture, especially in view of the fact that, owing to its high altitude, it is subject to heavy summer frosts throughout every month in the year. I have, myself, seen ice a quarter of an inch thick in our cooking kettles in camp on the Nechaco in the middle of July. The snow goes off the ground in most seasons, I should think, early in May, but there is no significant growth of any kind before June.

Wheat will not grow on any portion of the Nechaco valley. Oats and barley, however, will ripen some years in favoured parts. Roots and vegetables, such as potatoes, turnips, carrots, cabbages, etc., usually do fairly well, but it is not at all uncommon to find the potato tops frozen down to the ground, and last season, for instance, snow fell before the oats and barley were ripe and beat them down in such a way that, although the snow afterwards went away, the crop was ruined. This occurred at Stuart Lake and Fraser Lake.

For pasturage purposes the Nechaco is a beautiful piece of country during the summer, and there is abundant pasture in all directions from June until the end of September. There are many large swamps and meadows where hay can be made, and which the Indians, who all have a few horses and cattle, make use of to a greater or less extent.

I met a party of three men with some twenty animals, all packed, who had been induced to go up to the Nechaco in search of farming land. They had spent the whole of July prospecting in the valley, and they informed me that it froze more or less during twenty-one nights in that month, in one instance even going down to 25°, or 7° of frost. They were disgusted with the possibilities of the country. They had come prepared to winter there if the country had been any good, but, being disappointed, they were willing to sacrifice their supplies and horses for anything they would bring, and I purchased from them for our company all the staples they had brought in with them for their year's supply.

These men spoke in the bitterest terms of the misrepresentations made in the Government reports, and signed by a Mr. Poudrier.

We have a meteorological station at Stuart Lake, where the manager of the Hudson's Bay Company would be glad to give you any information. This, like many of the Company's posts, is a favoured spot, selected because it was so. You can get all the meteorological information you require from our Mr. A. C. Murray there, or perhaps more quickly by sending to the meteorological office at Toronto. The climatic conditions at Stuart Lake would compare very favourably with those of the Nechaco, which is some 50 miles distant.

Yours truly,

R. H. HALL.

Mr. Oliver G. Harbell, who accompanied Mr. Poudrier, furnishes the following climatological data:—

Telegraph Trail, 13 miles from Quesnel, 23rd June, 1893, had heavy frost at night.

Goose Lake, 24th June, rain at night; 25th, raining all day, heavy frost at night; 26th to 30th, very fine and hot.

Blackwater, 1st July, rain during the night, fine; 2nd, a.m. rain, p.m. showers; 3rd and 4th, fine.

Nattelsby Lake, 5th July, rain until noon, then fine.

Six miles beyond N. L., 6th July, thunder during the day, rain at night.

Ew-la-ta-zela Lake, 7th July, heavy rain and hail, thunder and lightning, heavy frost at night; 8th, fine.

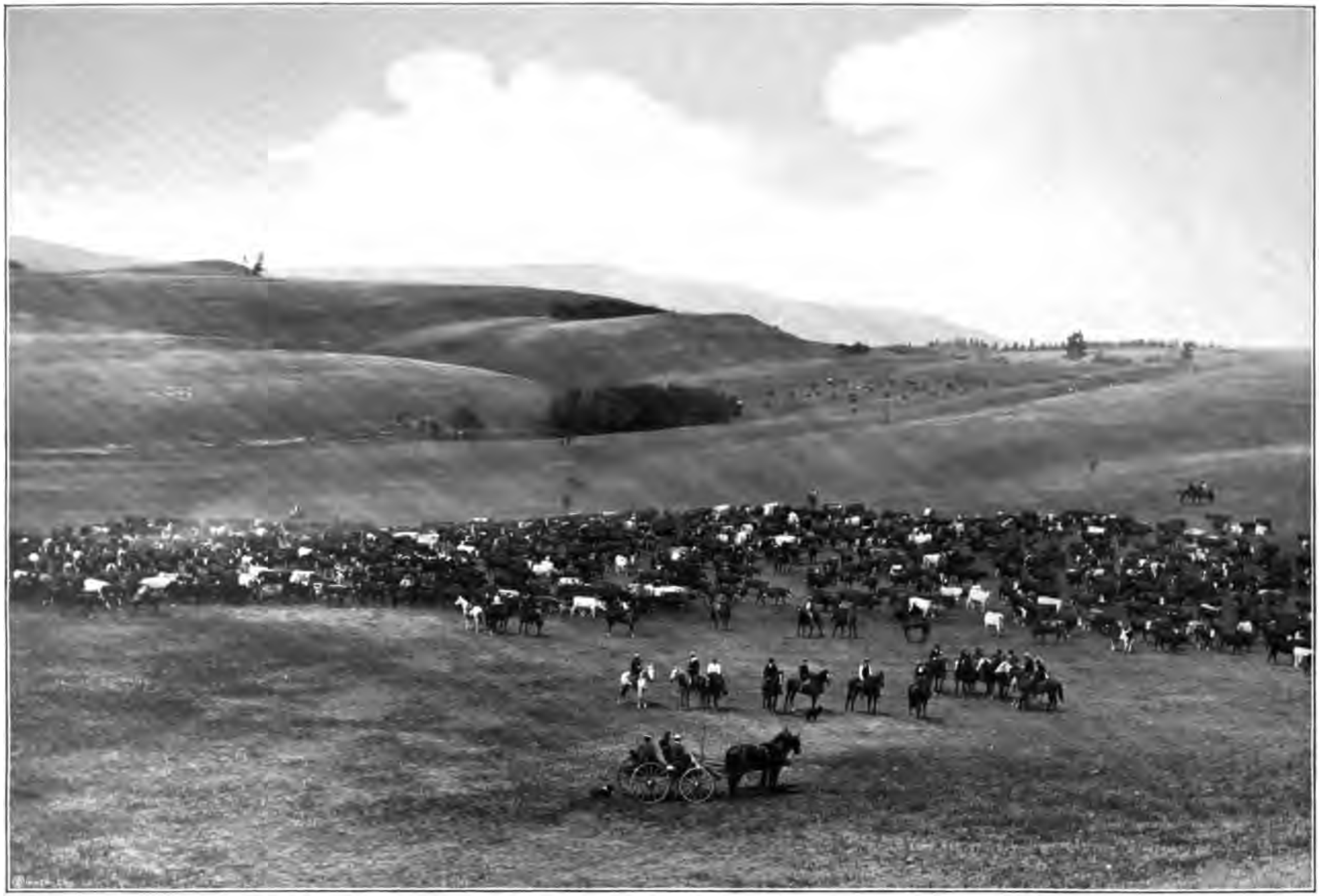
Tsinkut Lake, July 9th, rain all day.

Stoney Creek, July 10th, showers; 11th to 16th, fine clear weather.

Nechaco, July 17th, frost during the night; 18th, 19th, 20th, clear weather, cool nights; 21st, fine, thunder, lightning and rain during the night; 22nd, 23rd and 24th, fine and clear; 25th, p.m., thunder, lightning and rain; 26th, rain during the night, fine day; 27th, rain; 28th, rain, very cool at night; 29th, thunder, very hot; 30th, thunder and lightning, very hot; 31st, thunder, very hot.

Nechaco, August 1st to 4th, hot sultry weather; 5th, rain early and at night; 6th, rain in morning, fine afternoon; 8th, showery during the day, rain at night; 9th, heavy frost, ice formed, fine day; 10th, heavy frost, ice formed, fine day; 11th, rain; 12th, heavy rain; 13th, showery; 14th to 17th, clear and hot, cool nights; 18th, rain at night; 19th, showery; 20th, 21st and 22nd, clear and hot weather; 23rd, heavy rain, thunder and lightning at night, fine day; 24th, rain during the night; 25th to 28th, clear weather with cool nights; 29th, fine; 30th and 31st, clear and hot.

Nechaco, September 1st and 2nd, clear weather; 3rd and 4th, clear weather, ice formed at night; 5th and 6th, showery evenings, fine day; 7th, rain during the night; 8th, rain during the night, fine day; 9th, dull and cloudy; 10th, fine day, ice formed at night; 11th, cloudy, heavy frost; 12th and 13th, cloudy, rain during the night; 14th, clear, frost at night; 15th, clear, showers at night; 16th, cloudy and cold, heavy frost at night; 17th, cloudy and



ROUND-UP OF CATTLE, KAMLOOPS.

cold; 18th, cloudy and cold, ice formed during night; 19th, cold, cloudy day; 20th, clear, heavy frost and ice during the night; 21st, cloudy, frost at night; 22nd, rain; 23rd, cloudy with rain at night; 24th, cloudy with frost at night; 25th, clear, with frost at night; 26th, clear, rain during the night; 27th, cloudy, rain during the night; 28th, clear, cloudy, rain and hail showers, frost at night; 29th, cloudy, frosty at night; 30th, cloudy, heavy rain at night.

Nechaco, October 1st, a.m., rain till noon, clear night; 2nd, showers of hail at times, hail during the night; 3rd, cloudy, some rain during the night; 4th, cloudy with showers, sleet during the night; 5th, flurry of snow, frosty at night; 6th, cloudy, snow during the night; 7th, a.m. clear, p.m. rain, clear night; 8th, clear, light fall of snow during the night; 9th, cloudy, light fall of snow during the night; 10th, clear; 11th, cloudy; 12th, cloudy and clear at times, clear cold night; 13th, cloudy and cold, p.m. snow; 14th, rain; 15th, cloudy, heavy frost during the night; 16th, clear, heavy frost during the night; 17th, clear; black flies very troublesome; 18th, cloudy, rain during the night; 19th, rain during a.m., heavy frost at night; 20th, foggy and frosty, night cold, freezing hard; 21st and 22nd, clear and cold, night cold, freezing hard; 23rd, light fall of snow, did not freeze at night; 24th, a.m., clear, p.m., showers of hail; 25th, cloudy, light fall of snow, then rain; 26th, cloudy, very cold at night; 27th, cloudy, snow during the night; 28th, at Stoney Creek, cloudy, freezing hard at night; 29th, clear and cold; 30th, showers of hail, very cold and snow at night; 31st, *en route* to Quesnel, cold, 1 inch snow.

Nechaco, November 1st, *en route* to Quesnel, cold, 1 inch snow; 2nd, near Nattelsby Lake, trail heavy, 8 or 9 inches of snow; 3rd, thawing, trail heavy, 6 inches of snow; 4th, Blackwater, cloudy, heavy frost at night; 5th, snowing all day; 6th, clear and cold, heavy rain during the night; 7th, clear and cold, thermometer 32°, arrived at Quesnel.

I do not think that there is deep snow during the winter in the Nechaco Valley, as the poplar trees do not show rabbit gnawings higher than 3 feet from their roots. This would indicate a snow-fall of about 2 feet.

At Stoney Creek and Fort Fraser the Indians raise good potatoes, carrots, turnips and cabbages.

Valley of the Upper Columbia,

In which is included Golden, Galena, Windermere and Canal Flat. This valley lies between the mountain ranges of the Selkirks and Rockies, whose lofty snow-clad peaks greet the sight at every turn, when travelling up the Columbia in a south-easterly direction from Golden. The valley varies in width from a mile or two to probably five miles. It must not be understood, however, that the whole of it is cultivable; much of it is low-lying swamp land formed by the Columbia, which is here a sluggish stream and navigable for stern-wheel steamers to within a few miles of its source. This land is, no doubt, susceptible of being dyked, and being alluvial deposit is naturally very fertile. At the present time the only use it is put to is for cutting wild hay. There is also a considerable quantity of rough and wooded land which requires clearing; this, however, is not of the formidable nature of the clearing required on the lands of the Coast. Lastly, there is a considerable area of land which is easily brought under cultivation, and which is very fertile, producing all the usual crops and fruits. The foot-hills are lightly timbered and form good ranges for stock.

Golden is on the main line of the Canadian Pacific Railway, at the confluence of the Kicking Horse River with the Columbia, and at an altitude of some 2,580 feet above sea level. The Columbia, as was mentioned before, being very sluggish between Golden and Canal Flat, there is little difference in the altitude at any of the points I mention.

Galena is about 40 miles by road from Golden; Windermere about 41 miles further, and Canal Flat about 28 miles from Windermere. A good waggon road connects all these places, and during part of the season communication is also maintained by steamer. The land in the vicinity of Galena is generally wooded. Windermere is a charming spot situated on the lake of that name, the lake being really an enlargement of the Columbia River. Canal Flat is situated at the head of the Columbia Lake, the source of the river. A bit of rough water between the outlet and a point a few miles further down, however, stops steamer navigation a few miles above Windermere.

The following is the report of Mr. John Bulman, correspondent at Windermere:—

GENERAL DESCRIPTION.—Land for agricultural purposes is very limited where irrigation is possible. Of course the pasturage is good over the whole district, native grasses being bunch-grass, buffalo and pine grass in abundance. The soil is of a sandy loam on benches and alluvial in the low lands. A good Government road runs north to Golden, C. P. R., and south to Fort Steele, Windermere being almost midway between the two points, providing a good outlet for surplus produce. During the navigation season, steamboats run a bi-weekly service to Golden, on the Columbia River. Windermere being a mining district, ranchers find a home market for all their produce. There is a Government school. This is a good sporting district. Deer, goat, moose, elk and mountain sheep abound in the mountains around. Fish are plentiful in the lake, char and ling principally. Char have been caught weighing 13 pounds, but the average weight of each species is about 8 pounds. The town is beautifully situated on the *Lower Columbia Lake, and has an abundant supply of good water from the creek running into the lake. The climate is very healthy, neither extremely hot in summer nor cold in winter.

WHEAT.—Only a little spring wheat produced, principally for chicken feed, the average being 30 bushels per acre. No complaints made about weather, disease or pests. Ruling price, 2½ cents per pound.

OATS.—White oats are generally grown, but no distinct variety. Average yield, 55 bushels per acre. Ruling price, 2½ cents per pound.

RYE.—Grown principally for green feed. Where proper attention is given to irrigation, a second crop can be gathered, yielding about one ton to the acre each cutting.

POTATOES yield, on an average, six tons per acre. Varieties are: Early Rose, Burpee, and Uncle Sam; quite a number of the latter variety three pounds each. Price, 1½ to 2 cents per pound.

OTHER ROOTS AND VEGETABLES.—Onions are grown, on a small scale, for own use, some from seed, but mostly from sets. I have seen onions grown from seed this year measuring 12 inches in circumference; these were Yellow Globe Danvers. Beets, parsnips and cabbages are grown for home consumption. This year's crops were fair only, on account of the ravages of cut-worms, cabbages suffering most from the pest. When any of these vegetables are sold prices are: Onions, 5 cents per pound; beets and cabbages, 3 cents per pound; parsnips, 2 cents per pound.

GRASSES AND CLOVERS.—Timothy is mostly grown for hay, but I cannot recommend it for general purposes. *Bromus inermis* is much superior in that respect, and quite a number of farmers, in seeding down land, are resorting to the latter grass. Average yield of Timothy, 1½ tons per acre, although I have seen as high a yield on patches as 4 tons per acre on well cultivated land. Average price, $25 per ton. Rye is being tested for winter feed. I cannot give you definite details as to acreage and yield of the Austrian Brome grass, but all who have sown it speak highly of it, and predict it is the coming grass for hay. Native grasses are bunch-grass, buffalo grass, and wild meadow hay. The two first-named are highly prized and are very nutritious, but the wild hay is not of much consequence, although quite a lot is cut and fed to cattle and horses to tide over the winter; but I consider it objectionable feed for either milch cows or horses that are working, though it does well enough for young stock.

APPLES.—There are only two small orchards in this district that are worthy of report. These are at Fairmont Springs. Mr. Brewer, Fairmont, who commands a wide experience, had a splendid show of Transcendant Crab and other apples. The varieties of apples which are a success are: Snow, St. Lawrence and Northern Spy.

SMALL FRUITS.—Strawberries grow to perfection here. Gooseberries, Black and Red Currants are also successfully grown.

DAIRYING.—Private dairying is carried on, but on a small scale, with satisfactory results. Butter sells at 35 cents per pound.

HORNED CATTLE.—Until recently the breed of cattle has been poor, and very little effort was made to introduce new blood and good bred stock. Now, however, ranchers recognise the necessity of improving the breeds, in order to attain the best results. There are now pure bred Galloway, Shorthorn or Durham, and Herefords. I consider the Durham breed the most profitable, both for dairy purposes and for beef. Price of beef, 8 cents per pound. Milch cows are worth $55 per head. I would recommend cattle-raising in preference to sheep, although sheep do very well.

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*Lake Windermere now.—J. R. A.

Horses.—Agricultural horses are mostly imported, there being none bred of necessary size and weight. Prices range from $100 up to $125. Those bred in the valley are small, but suitable for saddle and packing. Prices from $15 to $30, according to size. I consider there are too many of the small class of horses, which should be sold off and the capital invested in a larger breed of animals, such as the Cleveland Bay, which, in my opinion, would be an ideal horse for this valley.

Sheep.—I do not consider this district suitable for sheep-raising, and it is not carried on to any great extent, partly on account of the low quality of the wool, owing to the pitch dropping from the trees. If the land were cleared, I have no doubt sheep would do well, if carried on in a systematic way. Prices, from $3 up to $7.

Swine.—There are very few pigs raised. Pork sells from 12 to 15 cents per pound.

Poultry.—There are quite a number of fowls raised, and it is a remunerative industry. Brahmas and Leghorn are the principal breeds. Prices: from 50 cents to $1 each for chickens; eggs, 35 to 40 cents per dozen. The long winters are discouraging; only a limited number of eggs to be got during the most of the winter.

Clearing Land.—There are no stumping machines of any consequence, and I would suggest that the farmers co-operate and secure a practical machine. At present small trees are pulled down as they stand, with a good team and block and tackle; the larger trees are cut down, and the stumps taken out with an axe and spade, which is a very slow process.

Timber trees are Douglas fir, tamarack, bull pine, and a little cedar.

Weeds.—I have seen the Canada thistle in this valley, south of Windermere, but not to any great extent. Pig-weed and wild mustard are very prevalent now, and are increasing seriously.

Cut-worms.—This worm made its appearance in July, and attacked cabbages and other vegetables during the night, doing most damage to cabbage and potato vines, but more especially to rhubarb, which they totally devoured. With regard to potatoes, turnips, carrots, beets and onions, they confined their attacks to the stem, or vine, and did not do any damage to the roots at all.

Noxious Animals.—Wolves and coyotes, which are increasing considerably. Indians seem averse to killing them, and to encourage their destruction I would suggest that the bounty be raised 50 % for wolves and double the bounty for coyotes. (Latter suggestion has been carried into effect.—J.R.A.)

Forest Fires are caused principally through carelessness in not extinguishing camp fires. I have no doubt there are instances of fires ignited intentionally by prospectors, in order to clear off the heavy brush and allow them to prospect certain districts more thoroughly.

Lands.—Government land is now very limited where irrigation is possible. There are a few sections of good land belonging to the C. P. R. and Kootenay Valleys Company; prices, from $1 to $8 per acre. Improved farms are increasing in value; prices, from $10 to $20 per acre.

Labour.—Whites, $30 to $40 per month and board; Chinese, $25 to $30 per month and board; Indians, $1 per day and board. Supply quite equal to demand.

East Kootenay,

In which is included all the country in the valley of the Kootenay River, from Canal Flat to the United States Boundary at Tobacco Plains, a distance of some 113 miles, Fort Steele and Cranbrook occupying about the centre. The waggon road spoken of as running through the Upper Columbia Valley continues through this district to Tobacco Plains; the river is also navigable for steamboats to the boundary, and, lastly, the Crow's Nest Railway, recently completed, gives access to Alberta, in the North-West Territories, and to West Kootenay. Fort Steele is beautifully situated on the bank of the Kootenay River, opposite to where the St. Mary's River empties. Cranbrook is a town on the line of the railroad. A considerable quantity of the land all through the valley is fit for agricultural purposes, some of it quite clear, and some partly wooded. A good local market is afforded by the mining camps in the vicinity, and by rail with the places situated along its line.

Meteorological Record at Tobacco Plains for 1900.

Highest temperature, July	97.1°
Lowest " February	20.4°
Rainfall	15.61 inches.
Snowfall	24.3 "

The following is the report of Mr. R. L. T. Galbraith, Fort Steele, and, of course, relating more particularly to that portion:—

GENERAL DESCRIPTION.—The best land lies along the Kootenay River, bench and bottom lands. The bottom land is a rich, black loam, and on the benches the soil is not so heavy, and is well adapted for roots of all kinds and fruits. There is a good market at Kimberley, Moyie and Fernie for the products raised; these places can be reached by rail. There are extensive coal mines at Fernie, and lead and silver works at Moyie and Kimberley. There is an excellent school at Fort Steele, with two teachers, where children receive a good common school education. The rivers abound with fish, and there is still a good deal of game, such as mountain sheep, goats, elk, bear and other fur-bearing animals. About fifty families can get good homes in the valley. The land is held by the C. P. R. and Kootenay Valleys Company, whose agent resides at Fort Steele; they are giving liberal terms to settlers.

WHEAT.—Not much fall sown. It is not profitable to mill, as we can get flour so cheaply from the North-West. The frosts did but little harm. Red Fife and California Club are grown; ruling prices, $1.75 to $2 per 100 pounds.

OATS.—Surprise and black are principally grown, but the yield during 1900, on account of too much rain before harvest, was reduced to about 25 bushels per acre. Ruling prices, from $1 to $1.50 per 100 pounds.

OTHER GRAINS, &c., are not grown, although the land is adapted to the purpose.

ROOT CROPS.—Potatoes fetch $1 per 100 pounds, and are grown to some extent. Other root crops are grown in limited quantities.

GRASSES AND CLOVERS.—Timothy is the principal grass grown, and yields from one-half to 3 tons of hay per acre. Ruling price was $15 for loose and $25 for baled hay per ton. We are just beginning to experiment with Austrian Brome grass, and a larger area will be sown the coming season.

APPLES.—All the hardy varieties, both summer, fall and winter, are grown. The yield was good; weather did not affect the crop much; south winds did some damage. No diseases or pests. Prices, from 2 to 5 cents per pound.

OTHER FRUITS.—Pears and plums are hardly successfully cultivated, so far. The hardy varieties of cherries are produced. Strawberries, currants, gooseberries, raspberries, etc., are grown with success.

HORNED CATTLE is a successful industry. Durhams are principally produced, and fetch from $50 to $60 each for beef.

HORSES.—Not many raised in the district. Good horses brought from $75 to $125 each.

Other live stock is not produced to any extent. Free from diseases and pests.

IRRIGATION is necessary for the successful production of crops on the benches.

TIMBER.—The principal timber trees are Douglas fir, yellow pine, spruce and tamarack (larch).

CUT-WORMS appeared in large numbers.

NOXIOUS ANIMALS.—Coyotes, wolves and cougars. The bounty has been raised on coyotes to $2, which is a step in the right direction.

FOREST FIRES.—Prospectors and campers should be compelled to put out their fires before leaving camp. Lightning has been a frequent cause.

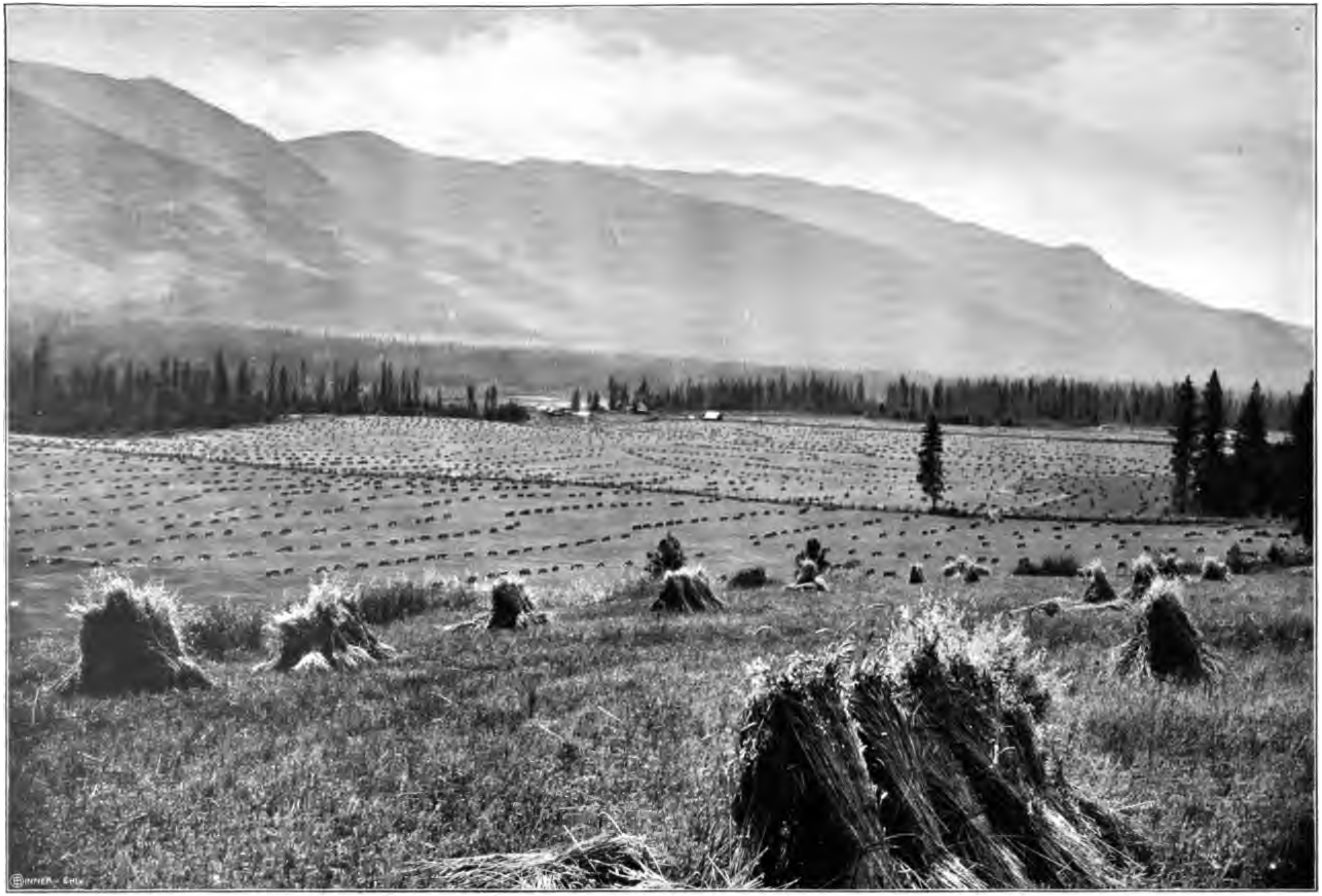
LANDS.—Not much left of Government lands. Railway land can be bought at a reasonable price. Bottom and bench lands, price, $2, $2.50, and $2.75 per acre, on time; say ten years for payment. Improved farms, from $5 to $10 per acre.

LABOUR.—Whites, labourers, $2.50; miners, $3 to $3.50 per day. Chinese, $2; Indians, $1.50 per day. We have now no difficulty in getting all the supply required.

Report of Michael Phillipps, Tobacco Plains:—

GENERAL DESCRIPTION—As fair a valley as any in British Columbia, sheltered to the north and east by the Rocky Mountain range, and open to the south and west. The climate is an exceptionally good one. The Tobacco Plains has long been celebrated as a winter range. Here, in days gone by, the Hudson's Bay Company sent their horses to winter from as far away as Fort Colville, on the Columbia River. At present we are 25 miles from the Crow's Nest Railway, but during this summer the Great Northern will have a line passing the Plains. Good waggon roads and some copper properties in the vicinity.

WHEAT.—Fall wheat has been tried, and in some places does fairly well, but, as a general thing, there is not snow enough to protect the crop in winter. There are no flour mills on the



RANCH, LANSDOWNE, SPALLUMCHEEN.

Tobacco Plains, and wheat is grown only for chicken and hog feed. Spring wheat grows remarkably well. Wheat grows well on much of the bench land without irrigation. The price during the past year has been $1.50 per 100 pounds.

OATS.—All kinds of oats grow well, and I have myself grown the Lincoln during the past two years, often, on irrigated land, getting 80 bushels to the acre. So far, we have had no rust or pests. Price, $1 per 100 pounds. The oat crop is usually harvested before the wet weather in September. Sometimes short straw on unirrigated land.

BARLEY, if planted early, grows well on the high grass lands without irrigation. The yield is always good. It is grown here for hog feed only, but when the Great Northern Railway is built through the Tobacco Plains to the coal mines at Fernie it will, no doubt, be shipped for malting purposes. Price, $1 per 100 pounds.

POTATOES.—The potato crop is, take it all round, the main crop, though the acreage is less than the land under oats. Tobacco Plains has for years had a name for its potatoes, nor do I remember, during a lifetime residence here, a single failure in the potato crop. Price, 75c. per 100 pounds; yield, 300 to 400 bushels per acre.

SUGAR BEETS.—Sometimes grown for stock. They do very well, and the percentage of sugar is said to be larger than in the East.

OTHER ROOT CROPS AND VEGETABLES.—All hardy vegetables grow well, and are shipped to Fernie in quantities. Price, about 2c. per pound.

GRASSES AND CLOVERS.—Clover is not as much grown as it should be; the main hay crop is always timothy. If it is cut in time, the best, perhaps, for horses; but unless roots are also fed, is not so good for cattle. At present we depend upon the range pasturage for cattle.

AUSTRIAN BROME GRASS.—This grass grows luxuriantly here, but timothy hay is always asked for, and when shipped fetches a better price. There is one disadvantage with the Brome grass: the sod, after a few years, is so heavy that it is hard to plough up, when a change of crop is desirable. Like the timothy, it grows wild here, and that not from accidental seed, but from long before the advent of the white man.

NATIVE GRASSES.—For general range purposes, the bunch-grass still remains unapproachably the best; nor on the high, dry, rolling grass-hills has any grass been found to take its place.

Bromus breviaristatus has not been tried here.

Bromus inermis grows well on the farm lands, but comes to nothing on the dry hills. It can never replace the bunch-grass, which dries and ripens on the range and still is good feed for animals.

APPLES.—The Yellow Transparent, Duchess of Oldenberg, Ben Davis, Wealthy, Fameuse, Henry Anderson; all in fine bearing; no country could suit them better. There are also growing on the Plains: Blenheim Orange, Golden Pippin, Martha, Transcendent Crabs—bearing. Greenings do not do so well here. Price, 3c. to 5c. per pound. The hard winter of two or three years ago killed off about 10 per cent. of unsuitable kinds, but none of the kinds above mentioned.

PEARS.—Pears are less hardy than the apples, and the varieties here do not appear to be the best for these parts.

PLUMS AND PRUNES.—The few that have been tried are doing well.

CHERRIES do very well, though the hard winter of three years ago, with late March hard frosts, killed quite a number of trees. The following are bearing well here: Early Richmond, English Morello and May Duke.

SMALL FRUITS.—Currants, gooseberries and raspberries do very well indeed. Strawberries also do well and produce very large crops; the plants, however, should be covered with straw in the winter. Mildew and diseases at present unknown and yield large. All these berries are found in a wild state here, the wild raspberries often as large as the garden varieties.

DAIRYING.—A good deal of butter is made, but not enough for the home market. There is a good opening for several dairies.

FEEDING.—Up to the present time little care has been given to feeding milch cows, but as the range becomes more fenced up feeding will be absolutely necessary. There is plenty of green grass up to the end of June, when the grass dries up and the flow of milk falls away very fast.

HORNED CATTLE do well here and pay well, but year by year the range is being more fenced in.

SHEEP.—There are no sheep here, with the exception of a small band of my own for summer use. They do very well on the dry grass hills. Lambs, by September, weigh 70 pounds. They are of the black-faced Shropshire breed. Price, 10c. (6c. by the quarter). More sheep would pay well, especially for summer butchering. I have only tried the Shropshire. No country could possibly be better adapted for sheep—high, dry, rolling grass hills. I obtain $7 readily for an animal when butchered in the summer.

HORSES.—During the past year the price of horses has been much higher. There are too many Indian ponies on the range. Good team horses fetch $150 a pair; riding horses, $40 to $70; ponies, $10 to $30.

SWINE.—The Berkshire and Poland China do best here, and are hardy. Only a limited number of swine are kept on each farm. It pays better to sell grain than to fatten hogs at present.

POULTRY.—A large and never-failing demand for eggs at fair prices; 20 cents per doz. in summer; 40 cents per doz. in winter. Yet the fact remains that several who have gone into poultry on a fair scale have, after a year or so, gone out of the business.

DISEASES OF ANIMALS.—Distemper at times in horses; black-leg in cattle during the very hot weather. Cattle get too fat on the range in summer.

CLEARING LAND.—Nothing but light clearing has so far been necessary on any of the cultivated lands in this section of the district. Draining is never necessary; a dry climate and a dry soil. The rainfall and the snowfall is very light.

IRRIGATION.—All the best farms are irrigated. A few years ago it was supposed that nothing could be grown here without irrigation. Now, much grain and many good fields of potatoes are grown without artificial watering. Roots, other than potatoes and cabbages, cannot be grown without irrigation; the summers are too dry. Much land may be brought into use by bringing water from Elk River and other large streams—a costly piece of work, however.

TIMBER.—Douglas fir on the foot-hills, red pine (*P. ponderosa*) on the plains, black pine in the mountains, cottonwood and spruce along the rivers.

WEEDS.—We have the Canada thistle, and most of the weeds common to the country. The wild buckwheat is the most annoying.

POISONOUS PLANTS.—The wild parsnip (*Cicuta*—J. R. A.) is occasionally found in places, and the garden parsnip, if left in the ground for the second year, becomes poisonous. This may not be generally known, but horses have certainly been poisoned by eating it.

CUT-WORMS.—Last summer the cut-worm appeared in large quantities for the first time. Much of the cabbage crop was distroyed; they did not attack other vegetables to any extent.

NOXIOUS ANIMALS AND ANIMAL PESTS.—The only serious animal pest is the ground squirrel (marmot); they are increasing to an astonishing extent. Now that the lynx, coyotes and animals that feed on them are killed out, there is no way of keeping them down. These marmots destroy acres of oats and grain.

LANDS.—Most of the land left is railway land. About $4 per acre for grass land. Improved farms of value fetch a high figure.

LABOUR.—Whites, $2.50 per day at harvest time; $30 per month. No Chinese or Japanese. Indians, $1.50 to $2 per day for harvest work; $1.25 occasional. During the past two seasons there has been a great difficulty in getting help at harvest time and for digging potatoes. Still, the demand for steady work is very limited, except at harvest time.

West Kootenay,

Including the valley of the Columbia from the Big Bend, above Revelstoke, south to the International Boundary, a distance of some 200 miles, and the valley of the Kootenay River and Lakes from the Boundary Line north, a distance of some 45 miles. This covers a vast extent of territory, but inasmuch as it is almost altogether a mining region, it is all lumped together. Several towns, some of considerable size, such as Nelson and Rossland, are included in this section; also others of lesser size, such as Revelstoke, Kaslo and others. The communication between these places is good, and consists of railroads, steamers and roads, and access is easy by the same means of transportation to outside places. The land fit for agricultural purposes is comparatively small, generally wooded, along the valleys of the rivers, and in places requiring dyking, and while there does not exist large bodies of land suitable, still there are patches from 50 to 1,000 acres in extent. In the Big Bend, on Goldstream, there exist large stretches of land that are covered with wild grass, at the same time the land is subject to overflow during high water. George Laforme, the packer, finds this land suitable for grazing his pack animals during the open season in the Big Bend. Between Revelstoke and Carnes Creek there are some splendid flats suitable for cultivation, but covered with heavy growth of cedar. Between Carnes Creek and Downie Creek there are some nice benches, also covered with a growth of heavy timber. The great drawback is, there is no market available for their products, everything has to be packed on mules' backs, costing on an average 7 cents per pound. In the vicinity of Revelstoke quite a large quantity of land is under cultivation. Hall's Landing is the best farming land in this district. Galena Bay has quite a good piece of land that requires clearing. In the pass between Thomson's Landing and Trout Lake quite a lot of land has been taken up during the last few years, and no doubt, as soon as the mines are worked, the land will be cleared and placed under cultivation. On Fish Creek there are large sections of good land which is heavily timbered.

The town of Revelstoke is situated between the Golden and the Selkirk ranges, on the main line of the C. P. R., at the point where it first crosses the Columbia River, going east, at an altitude of 1,493 feet. The river is navigable for steamers to this point from the American boundary through the Arrow Lakes. A branch line of the C. P. R. also runs down the river as far as Arrowhead, the point where the river runs into the Upper Arrow Lake. A large quantity of ore is transported by these means to Revelstoke and thence by the C. P. R. to various smelters. At Revelstoke and along the railway line one is struck with the luxuriant growth of red clover and the thriftiness of the vegetable and root crops. This being a wooded section, no live stock, with the exception of poultry, is raised.

Further south, that is along the Arrow and Kootenay Lakes, there are small patches of alluvial bottom land at the mouths of streams, flats of small extent on the lake shores, and here and there strips of higher land, gravelly loam slopes forming the base of mountains which rise abruptly along almost the whole of the shores of the lakes, comprising the only area fit for cultivation. The rest of the district is rugged in the extreme, and were it not for the great wealth of the mines would be worthless for all other purposes. As it is, the large and increasing mining populations of the Cities of Rossland, Nelson, Kaslo and elsewhere are creating such a profitable market that agricultural lands of this description must soon be occupied and cultivated. Such patches of land as have been referred to are extremely productive, especially for fruits. On the ranch of Mr. Collins, on the lake shore opposite Nelson, are found apple, pear, plum, cherry and peach trees, all exceedingly healthy and free from pests. At a point on the Lower Arrow Lake, called Killarney, a trail leads into White Valley to Vernon, about 72 miles, through which cattle can be driven.

METEOROLOGICAL RECORD FOR 1900.

At Rossland:—

Highest temperature, July	96.4°
Lowest " February	– 9.5°
Rainfall	19.13 inches.
Snowfall	163.6 "

At south end of Kootenay Lake (Reclamation Works):—

Highest temperature, July	87.0°
Lowest "	– 8.0°
Rainfall	19.98 inches.
Snowfall	46.0 "

At Nelson:—

Highest temperature, July	94.0°
Lowest " November (record not given in Feb'y)	2.0°

Precipitation not given.

At Pilot Bay:—

Highest temperature, July	89.0°
Lowest " February	1.0°

Precipitation not given.

Mr. J. Wm. Cockle, correspondent at Kaslo, makes the following report:—

GENERAL DESCRIPTION.—The valley of Kootenay River, south from the end of Kootenay Lake to the International Boundary, and from the northern end of the lake for a distance of over 50 miles, is particularly adapted for agriculture. The soil, a rich silt, is remarkably productive, and all kinds of fruit flourish luxuriantly. A ready market for everything grown is found at the mining centres of Kaslo and Nelson, to both of which there is daily connection by two lines of steamers, which connect with railways at either end.

POTATOES have sold for $20 per ton this fall. Crops good; attacked by cut-worms in places.

APPLES.—Red-hump caterpillar did a little damage; no remedies applied. Apples sold for $1 per box of 48 pounds. One apple from the orchard of Fred. Little, Creston, on line of Crow's Nest Pass, which was sent me for exhibition, weighed 25 ounces, and was 16¾ inches in circumference.

OTHER FRUITS.—Plums and prunes yielded well, and sold for 2½ cents to 3 cents per pound. Strawberries thrive on any land near the lake shore; crop good. Prices, $2.50 per crate of 24 1-pound boxes.

DYKING.—The dyking of the Kootenay River bottom has proved a failure, and has been abandoned.

TIMBER.—Douglas fir on hill-sides; pine, white, on bottoms and gulches; cedar on bottoms; hemlock, spruce and tamarack on mountain sides; all abundant. Bush fires have destroyed immense areas, and it is hoped that some drastic measures may be taken by the Government to preserve one of the largest assets of the country from devastation. This should be pressed by the Department, viz.: The appointment of reliable men as rangers, with power to hire men and stamp out incipient fires, and arrest any guilty parties. Usual origin of fires is carelessness of prospectors.

ENTOMOLOGICAL.—The cabbage butterfly (*Pieris rapæ*), which the author reported as having appeared in the summer of 1899, has this year proved a great pest, whole gardens of cabbage were literally eaten up. Hellebore and pyretherine powder, mixed with flour, was found beneficial where applied. This dressing on gooseberries also proved of value to eradicate a small green caterpillar which attacked them in early spring.

CUT-WORMS.—(*Peridroma Saucia*). The hibernated moths appeared at end of May and deposited eggs everywhere, inside the house and out; attacked everything; mature pupa in August and moths emerged in beginning of September. Whale oil soap proved beneficial in killing this pest; no Paris green obtainable.

HARVESTING, VERNON.

HARVESTING, VERNON.

HOME FARM, B. X. RANCH, VERNON.

The fisheries of the district are of great importance, as they embrace a large portion of the world-famous fishing-ground of the Fraser River. There are twelve salmon canneries located here, including some of the largest on the river; the large number of men employed and the value of the product makes this a very important industry. The resident population of the district is about 2,000, but this is increased during fishing season to 5,000 or 6,000. Taken as a whole, the district is one of the richest and most prosperous in the Province; the taxes are not high, and the financial condition is good; the people are contented and prosperous, and satisfactory and steady progress is being made in wealth and population.

WHEAT.—Very little is grown here. That which is grown is used entirely for feeding stock and chickens. It is not considered hard enough for milling purposes, but should make good breakfast food. Ruling price, $25 per ton.

OATS.—Swedish, American, Banner, Russian Banner and Golden Giant are grown; average yield per acre, 2,500 pounds. The ruling prices were from $20 to $25 per ton.

BARLEY is grown successfully, and is used almost entirely for hog feed. I do not know of any having been marketed, and none has been used for malting purposes.

PEAS.—No peas grown here. People who have experimented with them say that they do not ripen, but keep on growing. This is probably due to the great fertility of the soil, and the moisture which the ground always retains.

POTATOES.—All standard varieties are successfully grown. The average yield for 1900 is about five tons per acre, which is about 33⅓ per cent. of an average crop. The failure of the crop is due to the cut-worm pest. Average price, $15 per ton.

OTHER ROOTS AND VEGETABLES yield largely usually, but were reduced to about one-third through cut-worms. Mangolds, price $5 per ton; carrots, $8 to $10.

GRASSES AND CLOVERS.—Timothy and Clover (principally Alsike) are grown for hay. Yield, about 2½ tons per acre; average price, $10 per ton. Timothy, I think, can be strongly recommended for hay which is to be marketed in cities, where most of our hay is shipped. For home use, most farmers prefer a good proportion of clover, mixed with Timothy.

RAPE is successfully grown, and is used for pasturing sheep.

ENSILAGE is not used to any extent.

FRUITS.—All the standard varieties are grown with fair success. Ruling prices: Apples, 75 cents to $1 per box; plums, 2 cents per pound.

DAIRYING is carried on to a considerable extent, and is increasing rapidly from year to year. Private dairying is considered profitable. Whether it is more profitable than co-operative creameries depends principally upon how much the dairyman knows about his business. Grass is never scarce.

HORSES.—The horse business has been profitable. There has been no over-production of *good* horses. Clydesdale horses and good roadsters are the best sellers. The Percheron I believe to be the best general-purpose horse for farmers' use. Prices have been from $5 to $200; good horses have been worth from $125 to $200.

SHEEP.—A good many sheep are raised. The industry is said to be a profitable one.

HOGS.—Swine production is being prosecuted systematically. The price has been about 6c. for pigs on foot. Berkshires are recommended. Many swine are fattened in the fall by letting them run on the grain fields. Where there has been a heavy crop there is always considerable left on the ground, and hogs do very well on it.

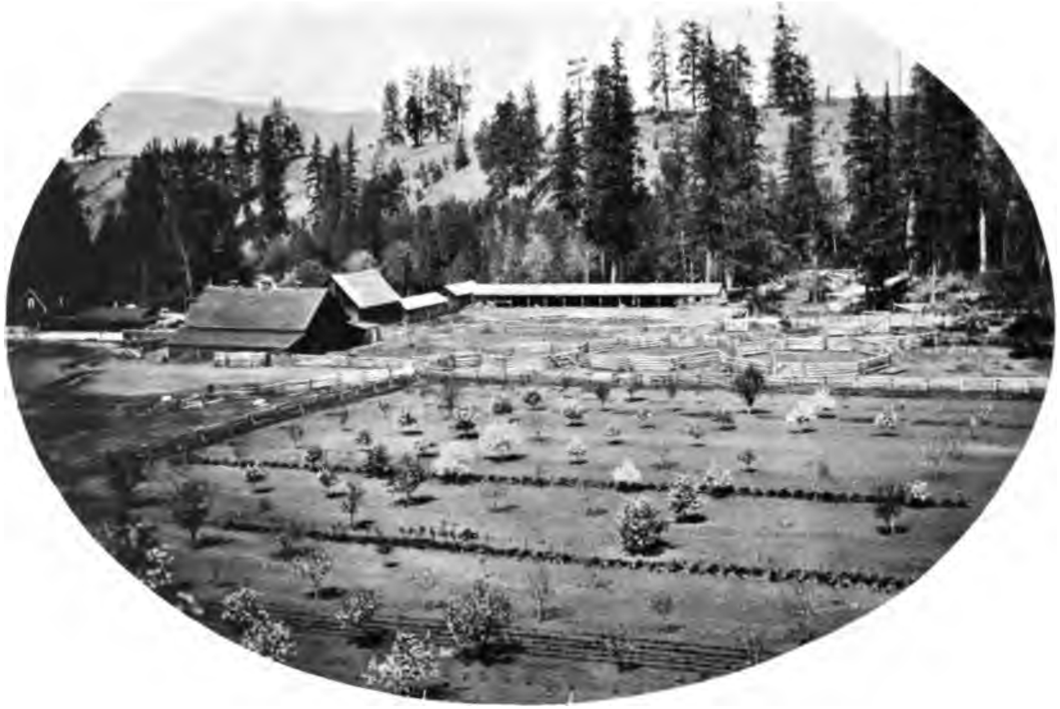
DRAINING.—There are some hundreds of miles of under-drains in this district; cedar is used principally. The manner of under-draining in this locality is as follows:—A trench is dug about 18 inches wide and about 2½ feet deep; then a single spade cut is taken out of the bottom, making a small trench about 6 inches wide and 8 inches deep. Cedar slabs are laid across the small trench or tongue and covered in. This leaves an under-drain 6 x 8 inches, which retains its shape in the stiff clay subsoil for an indefinite period. The cedar covering is good for possibly hundreds of years. A different method would probably have to be adopted in a subsoil of a different nature. The work is generally done by Chinamen.

DYKING.—It has cost $100,000 to dyke this district. The work was done by steam dredgers. The dyke has been most successful, and has increased the value of the land at least $20 per acre, or about a million dollars for the whole district.

ENTOMOLOGY.—Cut-worms appeared in large numbers in July, and did much damage to root crops. They seemed to be particularly partial to turnips, onions, potatoes, cabbage and other roots, their preference for each being in the order named. The moths were most plentiful in September.

HAY FIELD, DELTA.

HARVESTING, VERNON.



HOME FARM, B. X. RANCH, VERNON.

SUGAR BEET.—A few beets have been grown and analyzed as to percentage of sugar, and have turned out well, but the day has not come yet to grow them for sugar; not enough land cleared.

CHICORY has been grown in this district, with very satisfactory results, for a few years, but recently, I am informed, the coffee factories can obtain their supplies of chicory from Germany at so much cheaper rates than it can be produced here, that those parties who formerly grew large crops have now entirely given up this branch.

OTHER ROOTS AND VEGETABLES.—Generally, in the Hall's Prairie and Kensington Prairie settlements, large crops of onions and cabbage are grown, especially in the latter, where the soil is particularly well adapted to the production of onions.

GRASSES AND CLOVERS.—The principal grasses and clovers grown here for hay are Timothy and Clover, either Alsike or Broad Leaf. On the swamp lands there is a good deal of Red Top and Blue Joint grass cut for hay. Almost all the permanent pasture and hay lands have within the past few years become so infested with the wretched, soft, early variety of grass, locally known as "Skit" or "Velvet Grass," (*Holcus lanatus*—also known as Meadow soft grass and Yorkshire Fog.—J. R. A.) So much is this the case that the value of the hay is very seriously depreciated, as the stuff, when dry, is absolutely of no value for feeding purposes, and it grows so rankly that it is rapidly crowding out the more valuable grasses, etc. I think, while timothy is undoubtedly very valuable as a hay grass, there are many other varieties which would be much more so, if sown, as is done in the older countries, with a view to the production of pastures, and that are much more valuable when sown in combination with several other varieties of grass and clover. This subject alone is one that may well attract the attention of all dairymen and stock-breeders, and on which it would be well for the Department of Agriculture to obtain all possible information for the benefit of our farmers generally. For this district the yield is 2 to 4 tons per acre. Price, $8 to $12 per ton, baled.

NATIVE GRASSES.—Red Top, Blue Joint and wild clover I know to be excellent for pasture as well as for hay. I am aware there are some 12 or 15 other varieties of native grasses, but I have had no experience with them as to their feeding values.

INDIAN CORN.—Until last season I held the view that corn could not be grown with profit. I have now changed my mind on the subject, and propose to give more attention to this matter than I have in the past. I had a small trial patch, little less than ¼ of an acre, and find if the soil is properly prepared, fertilised, the seed planted in due season, and then thorough cultivation, the results are most gratifying. Many of the settlers in this district are growing from a small patch to several acres, with most satisfactory results.

RAPE.—I have grown rape for several years, and found it very satisfactory as a soiling crop for sheep, hogs, and sometimes for cattle.

ENSILAGE.—We have six silos in this district, and have no doubt we shall have more in time. The experience here has been that Red clover is the best thing for filling a silo. The barrel silo is the best.

FLAX.—I have carried on experiments in flax culture for many years, others have grown it for the seed to feed to calves, etc. My object has been to ascertain the value of the fibre produced here, as from experience and observation I was satisfied our soil, water and climate were all that could be desired to produce the very finest varieties of flax for the manufacture of linen fabrics. This, together with the immense annual demand for flax products in the salmon fishing industry of the Province, as well as the practically undeveloped deep sea fisheries of the West Coast, leads me to believe that in the production of flax lies, in the near future, one of our most remunerative crop products.

APPLES.—I think from what I have noticed on my own place, and also on many other orchards in the district, unless we adopt a different order of procedure, it will not be long before we will have no successful varieties at all here. The yield was very indifferent. The weather, just at the time the fruit was setting, was rather unfavourable. There are a very large number of trees set out, but the crop is insignificant in comparison. The orchards, almost invariably, manifest unmistakable neglect. Black spot on bark destroys more trees than everything else put together. Price, 80 cents to $1 per box of 40 pounds.

PEARS.—Bartlett, Clapp's Favourite, Winter Nelis, Seckel and Beurre Hardy are cultivated. Price, 80 cents to $1.25 per box of 40 pounds.

PLUMS AND PRUNES.—All ordinary varieties are grown. Diseases and pests are plum rot, aphis and tent caterpillar. Prices, 25 cents to 75 cents per box of 20 pounds.

DAIRY COWS, LADNER.

CHERRIES.—We had very heavy rains in June, which had the effect of cracking the fruit and rotting it. Prices, 50 cents to $1 per box of 20 pounds.

SMALL FRUITS do well in this district, except gooseberries, a good many of which mildew. Industry is said to be the best. The price varies from 3 cents to 10 cents per pound.

BOARD OF HORTICULTURE.—I believe that the Horticultural Board is doing good work and I would like to see their regulations strictly carried out, especially the marking of home-grown fruit.

DAIRYING.—In the aggregate there are a great many cows in this district, and a very considerable quantity of butter made and sold at the weekly market in Westminster. Private dairying is to a certain extent profitable, but, except in exceptional instances, not so profitable as when carried on on the co-operative principle.

FEEDING.—Hay is still our main winter feed, along with roots, mill feed, such as bran and shorts, chopped oats, barley and silage.

SUMMER FEED FOR DAIRY CATTLE.—I have found peas and oats sown late a very useful soiling crop. In this district there is no cultivation required, only let the land be good before the crop is put in. Sow the seed broadcast, rather heavy than otherwise, in about equal proportions, and cover in with spading harrow. Thus the seed will practically all be buried at about a uniform depth, and hence in a condition to make a rapid growth, as well as to resist the drought.

HORNED CATTLE.—No open cattle ranges in this district. Price of beef is from 6 cents to 9 cents a pound, dressed, according to time of year. Price of milch cows, from $30 to $60 each. Breed recommended, Shorthorn.

SHEEP.—Some of the lands are particularly well adapted to sheep-raising, but a great deal of it is still to be cleared, hence the flocks kept are very small, except in some few instances, Sheep have brought from $3 to $7 each. There is no demand for wool; 6 cents or 7 cents per pound. Southdowns and Oxford Downs preferred.

HOGS.—Swine raising is carried on with some system. Most of our pork is killed and dressed and sold in New Westminster market; prices are from 6 cents to 9 cents per pound. We let swine run on grass and turn them on the stubble after crop is off, or turn them on to a crop if we cannot save it on account of wet weather, but do not allow them to feed down crops as a rule. Berkshire is our best breed.

POULTRY.—A number of farmers are beginning to give a little more attention to this branch. It is the most profitable branch of agriculture, for the small amount of capital it takes. Last year the prices for eggs were 20 cents to 50 cents per dozen; my average was 26 cents a dozen. This year eggs have been down to 15 cents; are 45 cents at present. Poultry are worth: broilers, $3 per dozen to as high as $9 for hens; an average price is $5 per dozen.

CO-OPERATION.—The principle of co-operation is gradually making advances among the bush farmers, more especially since observing the success that has attended their efforts in the matter of obtaining free land, free timber, and remission of all land dues and accrued interest. I am strongly in hopes the time is not far distant when the farmers will take hold of this question of co-operation as applied to the agricultural problems of the day, in the same manner in which the industrial classes have done. When that happy day dawns, I may possibly be in a position to discuss freight rates and transportation charges with the blighting, grasping transportation companies; until then, it would seem, the Department of Agriculture should be in a position to lend a helping hand in the matter of exorbitant freight charges.

The Dominion Government Experimental Station at Agassiz is no doubt doing good work, but most of our farming in the whole Fraser Valley is done on soils of a different nature, and, therefore, the work is not of the same value to us as if the farm were so located that some of the work would be carried on on bottom lands.

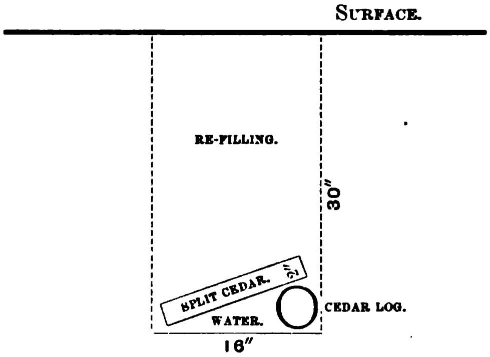
AGRICULTURAL EDUCATION.—I believe it would be a good thing if, in our rural schools, the children should receive lectures on agricultural chemistry and botany, etc., so as to get some ground-work on which those boys who will become farmers could build up, by reading, after they leave school. Let us begin at the beginning: We want teachers for the rural districts who are willing to acquire a knowledge of the things they see around them, and then to impart that knowledge to their pupils, and at the same time to encourage the pupils to have their eyes and ears open to their surroundings. And when there are Experimental Stations near, or Institutes being held, let those of suitable age attend, and the knowledge thus acquired, at a period when the brain is susceptible to lasting impressions, will be retained through life.

FARMERS' INSTITUTES.—The working of the "Farmers' Institutes Act" is all right, although it seems a hard matter to get farmers to take an interest in their Institutes, but I feel fairly confident that, with time and patience, they will. This is where agricultural education in the schools would do good work, so as to get the rising generation to take an interest.

SOILS.—I believe that all the soils in this district are short of lime. We have a large area of peat land that, somehow, will not give a crop. Through the lack of lime, the soil in many places is rapidly becoming infested with sorrel and other varieties of sour weeds and grass. Not only so, but our crops and animals require lime to enable them to attain full vigour and growth. The deficiency can be supplied, if there were cheap enough transportation, from Chilliwack, where there are immense deposits of limestone, seemingly placed there by nature for the very purpose.

CLEARING LAND.—There are two plans by which large stumps can be removed; one is by main strength in boring, burning, digging and eventually worrying the thing out of existence. There is another plan that is much easier, quicker and effective, viz., by the use of stumping powder, a good team, and blocks and tackle. By this means land can be cleared quickly, and at a very much cheaper rate than the first method. Again, there is another plan where the brains and powder are first applied, and then, instead of the team, a donkey-engine of suitable construction is used to haul the blasted stumps to the pile. Doubtless this is the cheapest combination of the three for clearing the land, but can, under ordinary circumstances, only be operated under Government or co-operative effort, owing to first cost of plant. The cost of clearing heavy timbered land is very great under ordinary conditions, if the value of time be taken into account; but when done by powder and machinery the cost is within the reach of many, and should be made a question of diligent enquiry by the Government. Cost varies from $10 to $200 per acre, according to the description of land.

DRAINING.—A good deal of under-draining has been done, and a great deal more is necessary to be done before the best results are obtained. The cheapest plan I know of is to dig the drains 16 inches wide and, say, 2 feet 6 inches deep; lay straight cedar rails, which are easily obtained in the woods, along one side of the ditch, and lay boards, 1 to 1½ inches thick and 16 inches long, one end resting on the rails and the other in the angle of the ditch. If the boards are laid in carefully this makes an excellent drain, and will last for many years, and costs complete, if the work is well done, about 40c. per rod.



SKETCH OF DRAIN.

DYKING.—A good deal of our land is dyked by individual effort. We had a co-operative scheme, but it failed through mismanagement. Our bottom lands are peaty and alluvial deposit. Two of our dykes have been built with a steam dredge, and the rest with Chinese labour with spades.

PECUNIARY ASSISTANCE.—I hold, and have for some years held, that the Government should make a bonâ fide effort to assist the struggling settler who goes into the woods to make a home, his only capital a stout heart, good muscle, and determination to succeed. You cannot get a man with capital to tackle the forests of British Columbia; he can purchase a desirable home in an improved neighbourhood. I have carefully read the Act referred to; believe the principle is good; endorse it; have advocated it in our settlers' meetings, but the bush farmers are not yet educated up to the point where any one of them is willing to risk his all to help out possibly one who may be regarded as a ne'er-do-well in any event. The proper way, in my opinion, would be for the Government to adopt the New Zealand method. The system works well there, and I believe it would work well here.

TIMBER.—The timber in this district is plentiful, and consists principally of Douglas fir, white fir, white pine, black spruce, hemlock, cedar, yew, cottonwood, soft maple, alder, red and white birch, vine maple, several varieties of willow, and dogwood.

WEEDS.—The Canada thistle has made its appearance in this district. This is the only weed we are afraid of at present. Our Municipal Council is making an effort to eradicate it.

POISONOUS PLANTS.—Wild parsnip is fairly common in this district. (Water hemlock. —J. R. A.)

ENTOMOLOGICAL.—We had cut-worms during July and part of August. The crops most affected were peas, potatoes, and garden stuff. A good many farmers think that our light yield of oats was caused by the worms piercing the stems so that the grain could not fill. Another pest for which I would like to get lime as a remedy is a white slug. They were bad this spring, and continued until harvest. I had the worst pea crop I have ever harvested, through the depredation of the small, white, slimy beasts.

NOXIOUS ANIMALS AND ANIMAL PESTS are skunks, wild cats, bears and musk rats.

LANDS.—There are about eight sections of Dominion Government land in Surrey. It is mostly timbered land, or rather stump land, the good timber having been taken off. Some of the soil is good, while some is rather light and in places gravelly. Improved land can be purchased at from $15 to $100 per acre. There are a great many most desirable places, with more or less improvements thereon, that can be purchased at from $5 to $15 per acre, now in the hands of mortgage companies, who are prepared to deal on the most liberal terms with prospective settlers. I shall be glad at any time to furnish parties enquiring for home locations with information respecting these lands in Surrey, Langley, Matsqui, Sumas, Chilliwack, Nicomin Island, Dewdney, Mission, Maple Ridge, or Pitt Meadows. Not only so, but I will go and show them the places, if so desired.

LABOUR.—Whites, $1 to $1.50 a day, with board; Chinese, $1 a day and board themselves; Japanese, $5 to $25 a month and board, according to time of year. During the fishing season we have a short supply; rest of the year the supply is equal to the demand.

Reports of A. H. P. Matthew, Langley, and Z. D. Page, Port Kells:—

GENERAL DESCRIPTION.—Langley lies between Surrey and Matsqui, and stretches from Fraser River to the International Boundary, and comprises about 120 square miles. The total assessed acreage is 76,542 acres, of which 59,740 are occupied and 6,704 under cultivation, and 10,098 acres of wild lands held by speculators. The total assessment of the district is $1,858,250, of which $311,260 is value of improvements. There are no railway or Government lands in the district. Tax rate, 4½ mills. No debt on municipality. The soil is generally fertile—some alder bottoms and some heavily timbered with fir, spruce, etc. The district is well watered and, as a rule, easily drained. Good crops of wheat, oats, potatoes, roots and fruits are raised. Of the fruits, peaches, grapes, pears, plums, apples and small fruit do well. Cattle and hay are also raised in abundance. Markets are situated at New Westminster and Vancouver. The Great Northern Railway at Cloverdale, and the Canadian Pacific Railway at Haney, are within easy reach. Three boats ply daily on the Fraser River. The district is well off for roads—about 200 miles in all, of which about 120 are good, and the remainder passable. The Yale Road intersects from east to west and connects with Westminster about nine miles from the boundary of the district. Game of various kinds is abundant. Schools to the number of 10 or 12 are scattered over the whole district. There are four postoffices—at one there is a daily mail, at others two mails a week. The climate is favourable, as may be judged by the products; rainfall averages about 5 feet per annum; very little snow; the river freezes over occasionally; very little thunder; prevailing winds, south-west in summer and north-east in winter; scenery splendid; Coast Range and Mount Baker visible from most of it.

Port Kells, including Barnston Island, is 10 miles from New Westminster. The soil is very varied; there is no Government land, but improved or unimproved land can be bought very reasonably. As regards cereals, roots and vegetables, the remarks under Surrey apply here.

GRASSES, ETC.—Timothy and clover are principally grown for hay; average price, $8 per ton. In my opinion, Timothy is not best suited for general purposes.

ENSILAGE.—Silos are very little in use here. By those who use them they are reported successful.

FRUITS of all kinds—the same as under Surrey.

DAIRYING.—Private dairying is very largely carried on here. No creamery has been in operation. One cheese factory ran for two or three years, but could not make it pay, although it produced a good article. Average price, 18 to 22 cents. From the number engaged in it, I should judge it profitable.

HORNED CATTLE are produced profitably. Milch cows, from $35 to $60; Jerseys, Durhams and Holsteins are the chief breeds. Beef, from 5 to 8 cents per pound.

SHEEP.—A large number of sheep are raised here, but all except lambs are affected badly with flukes. Price, $4 to $8.

CO-OPERATION.—It is very difficult to get the farmers in this district to co-operate. Jealousies and ignorance of the value of co-operation are, I believe, the chief causes of such a condition.

EXPERIMENTAL STATIONS.—More Experimental Stations are an imperative necessity in this Province, where the conditions are so variable. I believe that the work should be done by the Dominion and Provincial Governments, jointly.

AGRICULTURAL EDUCATION.—I have formed a decided opinion on this subject, and have given it a good deal of consideration. In my opinion, it should form part of the school curriculum, to the exclusion of some other subjects at present on the list.

Reports of John Ball and M. W. Morrison, correspondents, Matsqui:—

The topography of the District of Matsqui, which comprises Mt. Lehman, Peardonville, parts of Aldergrove and Abbotsford, and extends from the Fraser River north to the International Boundary Line south, and bounded on its west side by Langley and east by Sumas Municipalities, the Yale Trunk Road running through its centre east and west. The land is generally level and accessible; soils good, with abundant supplies of good, pure, running streams. Roads are being made and improved very much lately. A railroad is badly needed through this section, as well as all other sections south of the Fraser, to open up, populate and give shipping facilities to our Coast cities. Water communication is good on the river, there being a daily boat service up and down from Chilliwack to New Westminster. The school system is exceedingly good; wherever children exist schools are in existence, and maintained and kept open throughout the year by the Province. Of game, the supply is moderate. The class of labour required is chiefly for clearing land for agricultural pursuits.

CEREALS.—The same conditions existing in this municipality as in Langley and Surrey; the production of these crops is only of secondary importance, the comparatively limited area of land under cultivation being susceptible of being put to a more profitable use, although cereals of all kinds produce large crops.

POTATOES are, as a rule, very successfully grown on the high lands, and are equal to the Ashcroft in every respect. Poor average yield this year, owing to the blight and cut-worms in many parts. Ruling prices net the farmer probably about $15 per ton.

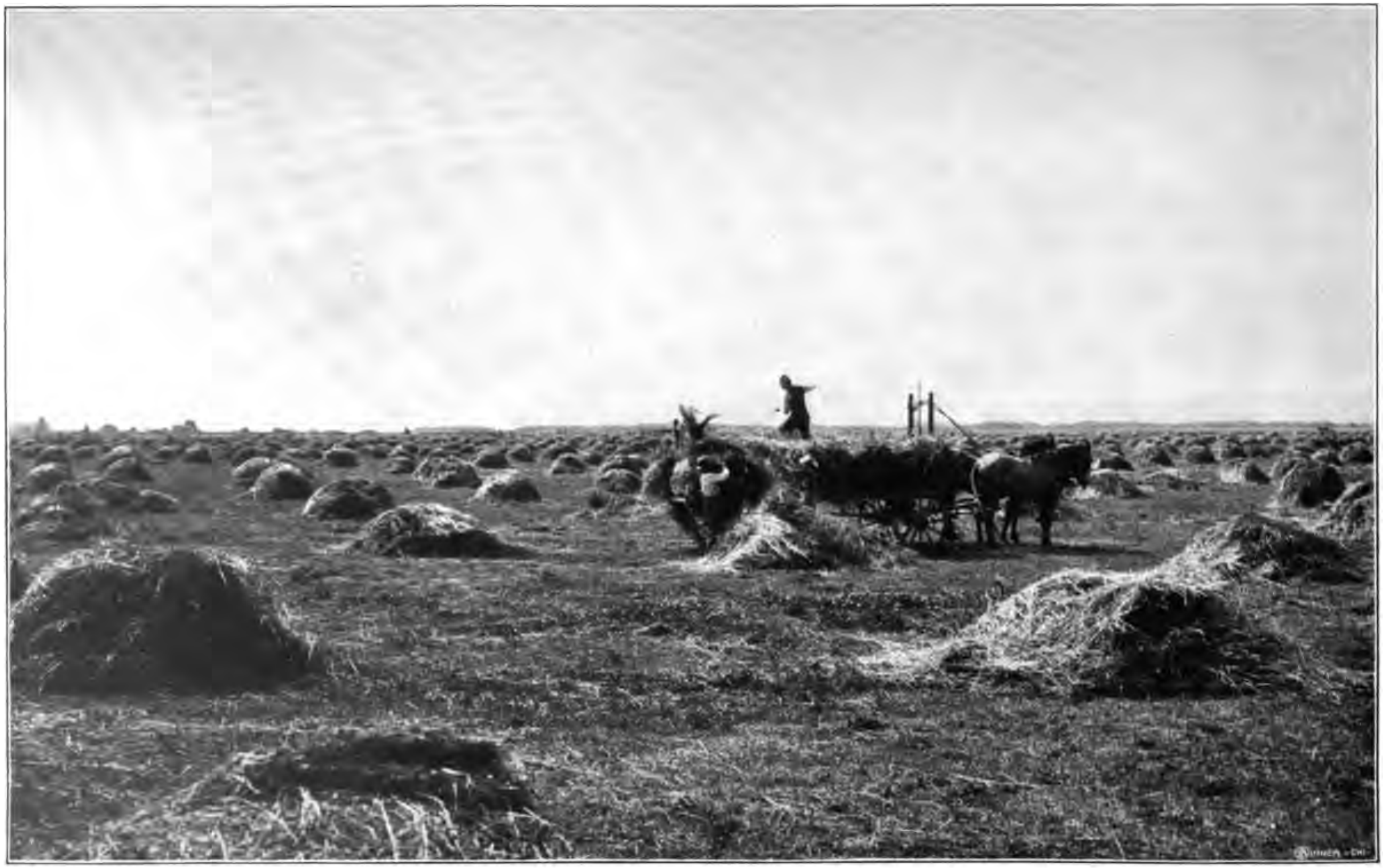
OTHER ROOTS AND VEGETABLES subject to the same conditions as in the municipalities previously mentioned, and those reports therefore answer.

HAY AND GRASSES.—Red clover and Timothy are the best known and most extensively resorted to in this district, and the yield this year was beyond the average, owing to the wet season suiting the growth of the clover on the higher lands. There are other grasses, it seems to me, which ought to take the place of Timothy. I don't know that ever I saw, strictly speaking, one field exclusively of this grass in England; it is more of a mixture there. There is an absence of sweet vernal in our grasses here.

OTHER GRASSES.—Our native grasses are the wild grasses on the prairie, which in the early spring are relished by the cattle, which soon become fat on them, but in the fall these grasses are not of much good; but they are the grasses on which a great many of the prairie farmers have to feed their stock during the winter, seeing that no other will thrive until this land is drained.

APPLES.—The worst disease in our orchards at present is the black spot; other diseases and pests, happily, are not numerous. The ruling prices are from 80 cents to $1 per box—freights, boxes and hauling to be deducted from these prices. The only known remedy for the black spot is to cut it out. A good many people have tried various washes, but they have no lasting effect.

OTHER FRUITS were affected from the same cause as affected apples, and the same remarks apply here as in those of the preceding municipalities.



HAY FIELD, WESTHAM ISLAND.

Board of Horticulture.—It is gratifying that the Board is exercising proper methods of inspecting fruit and fruit trees, to prevent the various pests from getting a foothold in the Province.

Dairying.—This industry is carried on only by about six persons in the whole municipality, viz., by those who are on or fringe the prairie, though a good many settlers will keep from three to seven or eight cows, and, of course, make butter; but what I mean by this is, it has not yet reached the stage to be called a dairying district. Butter ranges in price from 15 and 18 cents in summer to about 25 cents in winter, and often the shipping charges have to be met out of these prices. Cheese is not manufactured at all.

Horses.—The horse industry has been a very profitable one since the Klondike boom, but there are signs of their going down in price, though powerful draught horses of the Clydesdale, Percheron or Suffolk Punch type will always command a good price and prove a paying investment. The average price for a team of fair horses during the past three years has been $250 to $300.

Sheep.—Our district is and will be most eminently suited for sheep. When our lands are cleared on the higher parts there will be an entire absence of any disease known to sheep. The ruling price has been, for good sheep, from $6 to $8 dollars per head for ewes, and from $4 to $5 for lambs, ready for the market.

Diseases of Animals.—Happily, there are no diseases of a contagious nature among our animals, so that the operations of the "Contagious Diseases Act" are, in my opinion, sufficient; but in case of any large outbreak they might not be. There is a disease, and one that works disastrous results among many young calves, which should be more worked upon, remedies given, and, what is better, a preventive given. Red water in cattle is also prevalent; this also should be more studied, with the effect of removing or preventing it.

Soils.—This is indeed a very important question—one affecting the bread and butter of every man, woman and child in the Province. The soils are invariably lacking in potash and lime, and this deficiency is impossible to be dealt with by the average farmer. I believe if there were a more liberal use of these ingredients we should have less cause to complain of our fruits being imperfect.

Draining.—Under-draining is not carried on, nor is it greatly needed on the uplands, save here and there, but with the prairies it is totally different. Drain pipes are out of the question to buy, and cedar has to be resorted to.

Dyking.—In Matsqui there are large areas of land which are being reclaimed by the dyking and pumping operations now being carried out. There are both peaty and alluvial deposits, with a clay subsoil in places, while the peat deposits in others reach to a great depth.

Botanical.—Doubtless this is an interesting study where time and means afford. In the boarding schools of some parts of England, half a day a week is given for the scholars, attended by their teacher, to inspect the lanes and woods, with a view to learning botany in a practical manner.

Poisonous Plants.—The only poisonous plant is the water hemlock or wild parsnip, and the only remedy I have heard of is copious draughts of oil and lard.

Entomological.—Happily, we have been free from pests till the past summer, when an army of cut-worms appeared in many parts of the Province, devouring everything green.

Bush Fires should be guarded against in every possible manner. It is a serious national loss to see our forests destroyed by fire, and some more protection is needed and ought to be rendered from May till October. Doubtless some are caused by accident, but many by carelessness when setting fire to their log heaps and clearing land.

Land.—There are a few Government claims still to be had for pre-emption, but they are mostly in inaccessible parts, chiefly in unsurveyed or mountainous places, and not considered of much value for agricultural purposes; Railway lands there are none. The price of improved farms—I mean by that a few acres cleared and some outbuildings, such as abandoned or mortgaged lands—from $5 to $10 and $15 per acre, according to location and nature of the clearing and soils.

Labour.—Whites, $1.50 per day in summer and $1 in the winter season, with board; Chinese, about $30 in summer and $20 to $25 in winter; Japanese, from $10 to $20 per month, with board; Indians, about same rate of wages as whites.

Report of Orion Bowman, correspondent, Upper Sumas:—

General Description.—Upper Sumas is that portion of the Sumas Valley situated south-west of Sumas Lake and extending to the U. S. Boundary Line, comprising about half a township. The soil is nearly all alluvial except about one square mile in the south-west corner, where it is peaty. Nearly all is within the flooded district of the Fraser. There are, however, ridges (sand dunes) evenly distributed over the valley, so that no point is more than a mile from high ground. These are of great advantage in the establishment of cattle ranches, for by utilising them for centres we can keep the cattle during high water and winter, and use the native pasture and fodder to advantage. The drainage is naturally good, the country having a slope of about two feet to the mile to the north-east and many natural water-courses, the principal of which is the Sumas River, which, during the summer and late autumn, would be navigable for river steamers. The Mission branch of the Canadian Pacific Railway touches the south-west corner of our district at Huntingdon station, which is distant from our post office four miles. Abbottsford is about five miles from the latter place. A school is located at our post office; also one each at Huntingdon and Abbottsford. There is also an Episcopal Church at the latter place. Roads are pretty bad most of the time. The rainfall is more than sufficient.

CEREALS AND ROOT CROPS.—The remarks previously made under this head apply here.

GRASSES AND CLOVERS.—Red clover does well here, and usually the crop can be taken off before the flood reaches the higher ground. The stand is killed entirely by the water, but the crop is so valuable that it pays, even though it has to be re-sown every year or two. Native grasses and sedges are the principal stand-by. The principal grasses of the prairie are Red Top and Blue Joint.

CORN.—The earlier varieties of Indian corn do very well here.

ENSILAGE.—We preserve clover in a round silo successfully, and have filled the silo with oats and pea mixture, but up to this year our silo was not tight enough. We tarred it and caulked the seams with tarred rags, which, I think, has made it better. I believe a round silo would be successful if it were made of flooring, but I would not recommend a round silo otherwise.

FRUITS.—Reports from the districts previously written of answer for these.

DAIRYING.—Sumas Creamery is near the post office; it receives both milk and cream, mostly cream. Most of the patrons have cream separators, which is very convenient and economical, where the distance is great. There were fifteen patrons this summer, and about 40,000 pounds of butter have been made from 250 cows. There are double this number of cows within ten miles in British Columbia, and three times that number if the other side of the line were included, as it might be if there were no import duty on raw material (cream).

FEEDING.—Roots and hay for early winter feed, tops and all. Mangolds and carrots are better than turnips; the latter often have to be cleaned and cut before they will be eaten. Ensilage and wild hay for the later winter is our method. Either will do all winter, in the absence of the other. Cows must have have plenty of moist food to do well.

CLEARING LAND.—It is my opinion that for agricultural purposes rotting is the most practicable and economical with deciduous varieties. Cedars can best be taken out tree and all; the same with spruce. Land thickly covered with fir is not worth stumping. The usual outfit is a steel cable ¾-inch by 100 feet, a capstan (wooden will do), one or two snatch-blocks, half a dozen short chains of various sizes, and hooks. By using a "luff," that is, using the pulleys in compound order, sufficient pull may be acquired. Anything that cannot be removed in this way had better be dynamited out. For pulling down trees and all, a team should be used instead of a capstan, and manilla rope might be substituted for wire. If stumps are left to rot out, they help the drainage to a great extent.

PECUNIARY ASSISTANCE.—I do not know that anyone has utilised this Act. I am inclined against the principle, for the reason that it is likely to be abused by those least worthy of help; and unless the supervision of the Government is very close, it may prove quite a source of loss.

TIMBER.—On high land they come in this order of predominance: Fir, cedar, alder, hemlock, maple (soft), birch, willow, etc. On low land, flooded: Willow, birch, cottonwood, alder, hardhack (a red-flowered spirea). Unimproved land can be bought for from $5 to $10 per acre.

Mr. Horatio Webb, correspondent, Chilliwack, reports as follows:—

GENERAL DESCRIPTION.—Chilliwack is situated on the Fraser River, about 65 miles from its mouth. It is the best agricultural district in the Province, has good water communication daily with New Westminster, connecting by steamers there for Victoria, Nanaimo and Vancouver. The Canadian Pacific Railway runs on the opposite side of the river, and there is daily communication with it by boat. There is a trunk road also to New Westminster, crossing by ferry at that place A good home market for most of the produce, dealers coming up from the cities and buying from the farmers; first-class school accommodiation, eleven schools in the district; plenty of game, pheasants getting very plentiful; fishing, especially trout, is good; about 2,500 of a population; churches of five denominations, English, Presbyterian, Methodist, Baptist and Roman Catholic; good exhibition grounds, buildings, Court House, bank, four hotels, good roads and lovely pleasure resorts, especially for families; also a weekly newspaper, and all the different trades necessary for a farming community are well represented, as also all branches of business. Some very promising gold mines in the vicinity.

WHEAT.—Not much grown, mostly for chicken feed and Graham flour. The yield is good, also quality, but the land will yield more money in other crops, as at the present time more attention is paid to fattening cattle and swine, and we find peas and barley more profitable. The wheat this year was much lighter in yield and weight, owing, I think, to the season being wet and the grain ripened too quickly, especially the late sown grain.

GRAINS IN GENERAL.—Excepting oats, about the same conditions prevail as with wheat, viz., generally produced in limited qnantities for local use in feeding stock. Oats, however, are produced in large quantities for sale. Varieties of grain grown are: Wheat—fall, Democrat; spring, Red Fife and Campbell's White Chaff. Oats—Banner and Swedish; price, $20 per ton. Barley--Rough Six-rowed, Chevalier, Two-rowed, Hulless, Four-rowed. Peas—Mummy, Golden Vine, Prussian Blue, Canadian Beauty and Grey.

ROOT CROPS AND VEGETABLES stand in the same position as described in the preceding portion of this part. All are successfully grown. Large quantities of potatoes are sent to the markets, but other roots are mostly locally consumed for feeding purposes.

SUGAR BEET.—Danish improved sugar beet is grown for feeding and is giving good satisfaction, yielding as heavy as mangolds and being more relished by stock; it is also a better keeper. Beets are not grown for sugar manufacture, but I think it would be a good plan to have some grown and tested. I feel sure we can grow the quantity to the acre to make it very profitable.

GRASSES AND CLOVER.—Timothy, Red clover and Alsike are principally grown. White clover appears to do exceptionally well, growing everywhere. Yield, two and one-half tons hay to the acre; price, $8 baled and delivered at steamboat landing. Other grasses, from my own experience, are much better than Timothy for general purposes, Orchard grass, Meadow Fescue, Rye grass, Kentucky Blue grass, Sweet Vernal.

INDIAN CORN.—The early kinds of Indian corn do well, and I have had no trouble in growing it to the glazed state for ensilage. It has always produced a good crop of stock and corn; have grown it for four years.

ENSILAGE is a decided success; Red clover is now being used, generally with good results. The silo has come to stay; several new ones are going up every year. The round silo is the best; there is so much less spoiled than in the square one. Some stack and are well pleased with it, but there is more loss that way.

HOPS are successfully produced; the crop of 1900 was short. The principal market is England. Low prices do not warrant increased production, however.

APPLES.—Varieties are: Duchess of Oldenburg, Wealthy, Keswick Codlin, Gravenstein, Blenheim Orange, Talman Sweet, Roxbury Russet, King of Tompkins, Salome, Grimes Golden and Canada Red. Apples were mostly spotted, and we are troubled with a great many pests, and if something is not done soon to prove to the farmer the value of spraying, fruit growing will receive a great check. (Mr. Thos. Cunningham has since remedied this by giving practical lessons in spraying.—J. R. A.) Government experimental spraying has never been done here to give any satisfaction. People spray by fits and starts, so they get fits and starts results. Price, 50 cents to $1.25 per box of 40 pounds. Crab apples do well and find a ready market at good prices, from 1½ to 3 cents per pound.

PEARS succeed well, the following varieties being the favourites:—

Bartlett, Souvenir de Congres, Doyenne Boussock, Louise Bonne de Jersey, Seckel, Buerre D'Anjou, Clarigeau, Lawrence and Keiffer's Hybrid. Medium and very fair quality, not troubled much with pests. Price, 75 cents to $1 per box.

PLUMS, PRUNES AND CHERRIES all badly affected with rot *(Monilia fructigena)*.

SMALL FRUITS.—All small fruits do well, both in yield and quality, but are only grown for home use; too far from market to ship profitably.

DAIRYING.—Private dairying is a thing of the past; only a few are engaged in it, and they brand their butter "Creamery Butter." Private dairies are thus able to get a better price for their butter than before a creamery started. The creamery is owned by a private company. The working plan is to take milk or cream from outsiders and make it up with their own at cost. The Babcock test is used, and each patron is paid once a month, at the rate of butter fat supplied, less the making charges. Other expenses—interest on capital, insurance, wear and tear of machinery—are taken out of the surplus, and once a year a meeting is held of the owners and patrons, all meeting as patrons, to receive the accounts of the company. The profits are divided according to the amount of butter fat each patron has sent in for the year. I think this is the best possible plan a creamery can be run on. The owners being largely interested in dairying, our interests are theirs; and so far it has been very satisfactory.

FEEDING.—Quite a change has taken place in the way of feeding during the last five years, and we find that better feeding gives better returns. Quite a few cattle are stall-fed in the winter, with fairly good satisfaction. The silo is a great boon to winter feeding, and also increases the acreage of roots, turnips, sugar beets and mangolds. Winter dairying is on the increase, and a great deal of grain is now ground and fed on the farm, instead of being shipped off as in former years. Clover makes the best and cheapest ensilage; if you cut the first crop and put in the silo, you can cut the second crop for hay at a time when the weather is generally good. Clover hay is worth very much more than Timothy for feeding milch cows.

HORSES.—The horse industry has been a profitable one during the year. It is my opinion that there has been an under-production. Horses have been in great demand and at good prices. Breeding has been much neglected the last three years. Clyde or Shire should be produced, as being most useful for general purposes, as size seems to be in most demand. Ruling prices, from $100 to $175.

SHEEP are successfully, but not largely, produced, the favourites being Devons, South Oxfords, Shropshires, Lincolns and Dorset. Prices are: $6 for ewes; $4 for lambs, weaned; 6 to 8 cents per pound for wool.

SWINE.—Rape is being sown for pigs. Clover pasture is very profitable for pigs. The production of pigs is entered into quite largely. It is called here the mortgage-lifter. Pigs on foot, 4½ to 6 cents per pound; bacon, green, 12½ to 14 cents per pound; bacon, smoked, 14 to 16 cents per pound; hams, green, 14 to 16 cents per pound; hams, smoked, 16 to 18 cents per pound. Yorkshire, Berkshire and Tamworth, or a cross between any of these breeds, preferred. I think I prefer the Berkshire sire. Feed pigs good from start and get them to market as quickly as possible; 150 pounds, I think, the most profitable weight.

POULTRY is entered into, in one or two cases, with very satisfactory returns. Breeds preferred are: Plymouth Rock, barred and white; Wyandottes, white and silver-laced; Leghorns, brown and white. Eggs are worth 16 to 45 cents per doz. Ducks—Pekin, Rouen, and Muscovy. Geese—Embden and Toulouse. Turkeys—Bronze and White. All do well and are profitable, but not carried on on a large scale. I think, with good management, the poultry business would be very profitable.

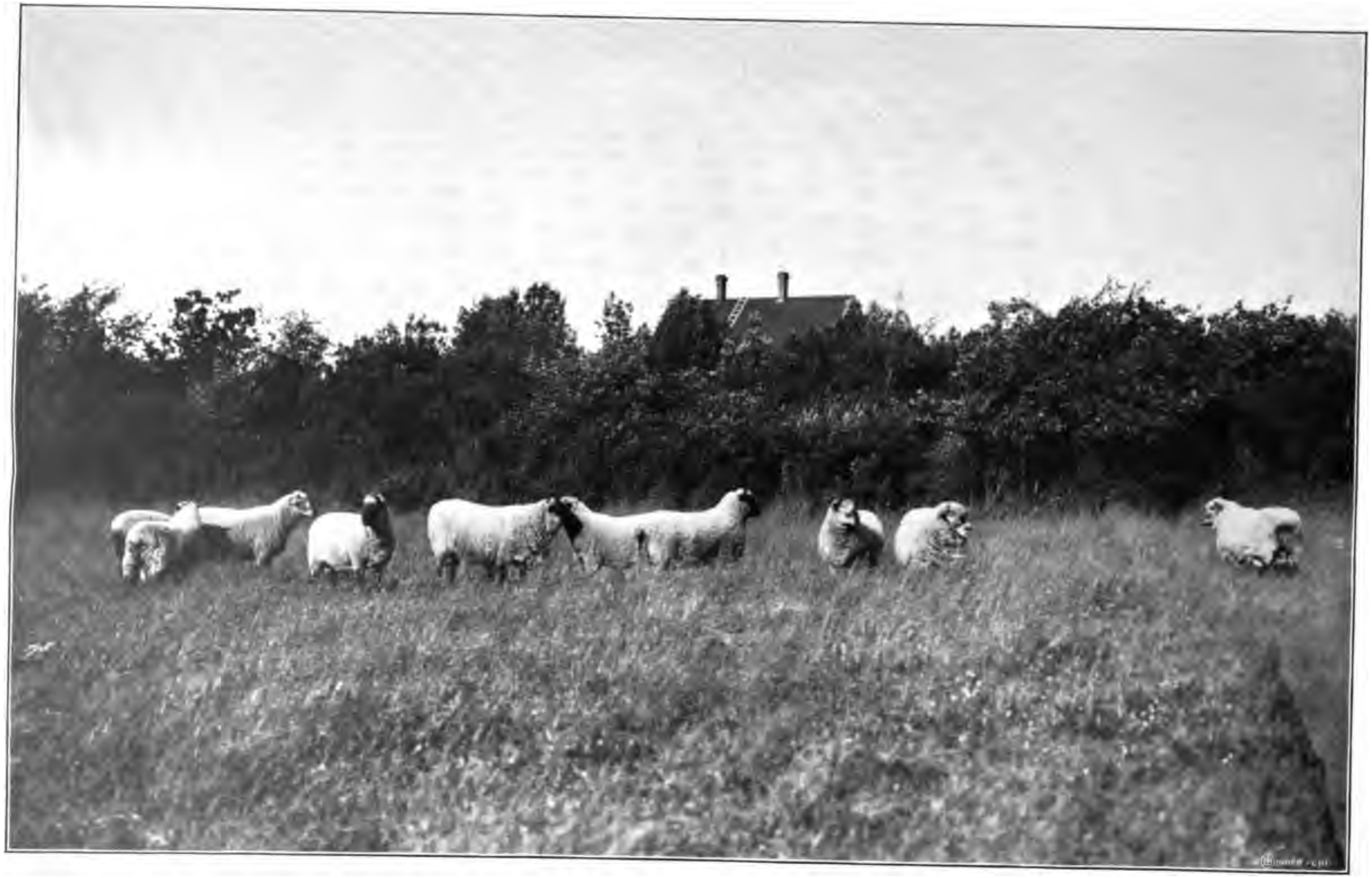
AGRICULTURAL EDUCATION should form part of the Public School curriculum of the Province, as the farmer of the present day, to be successful, should know more of the whys and wherefores of the growth of all vegetable and animal life.

CLEARING LAND.—As a rule, the light timbered and brush lands are cut in the early summer, burned in the early fall, and then seeded to grass, generally Timothy, but I would recommend mixed grasses and clovers, and used for pasture until the stumps rot or are easily taken out, which takes from three to five years. Have had no experience in clearing fir and cedar land.

DRAINING is done to a small extent, but I think the time is not far distant when we shall have to do more under-draining. We use cedar. After digging the ditch the required depth and the bottom levelled, we lay in cedar rails about 6 to 8 inches apart; then we take split cedar, about 1 to 1½ inches thick and about 15 inches long, and what width the block will make them, and lay them cross-ways of the rails; where the rails meet we nail the cross-piece so as to keep the rails in place, put on about 6 inches of straw or wild hay and cover with dirt. This kind of draining is cheap and, so far, has worked well.

DYKING.—Quite large dyking works are going on at the present time, with every prospect of good success. It is expected to cost about 40c. per acre.

WEEDS.—The law should be strictly enforced, as the Canada thistle is spreading alarmingly fast. Burdock and mustard should be looked after, especially the burdock, which the animals scatter around by collecting it with their tails and manes.



RAMS, LADNER.

The Cut-worm appeared about July 20th; that is when we first noticed the small worms on the leaf. Spraying with Paris green and lime had no effect on them; bran, mixed with Paris green, did the most good of anything we tried. It was easy to keep them off a patch by ploughing a furrow around it; they could not climb up the sides. They would get quite thick in the ditch in a few hours; then take a plank and drive around in the furrow and kill them.

Land.—Farming land, improved, from $35 to $100 per acre; unimproved, $10 to $25 per acre. Land has changed hands at these prices this year.

Labour.—Whites, $15 to $25 per month, with board; Chinese, $10 to $20 per month, with board.

North side of Fraser River.

From the mouth of the river to Yale, including the Municipalities of Richmond, South Vancouver, Burnaby, Coquitlam, Maple Ridge, Mission, Dewdney, Nicomin and Kent, and the unorganised districts adjacent to and to the eastward of the last-mentioned municipality. In this area are situated two of the principal cities of the Province, viz.: Vancouver and New Westminster, and the Canadian Pacific Railway runs through its entire length. There is more high land in this section than on the south side, but also an immense area of low lands liable, where not protected by dykes, to floods when the snows melt in the mountains, during the months of May and June. These lands are equally fertile with those on the other side of the river, and much the same conditions prevail.

Meteorological Records for 1900.

At New Westminster:—

Highest temperature, June	82.2°
Lowest " November	12.0°
Rainfall	67.22 inches.
Snowfall	24.05 "

At Agassiz:—

Highest temperature, June and July	90.0°
Lowest " February	9.0°
Rainfall	69.20 inches.
Snowfall	28. "

At Nicomin:—

Highest temperature, June	84.0°
Lowest " November	10.0°
Rainfall	81.56 inches.
Snowfall	30.5 "

At Vancouver:—

Highest temperature, August	85.6°
Lowest " November	15.4°
Rainfall	71.09 inches.
Snowfall	18.2 "

At Point Garry:—

Highest temperature, July	79.0°
Lowest " November	11.0°
Rainfall	45.70 inches.
Snowfall	12.7 "

W. R. Austin, correspondent, Coquitlam, reports as follows:—

General Description.—In the Municipality of Coquitlam, especially on Pitt Meadows, are good agricultural lands open for sale. Meadow land, ready for ditching, and all clear for plowing; prices, $10 to $40 per acre. Uplands in the municipality, more or less timbered, some good land and some medium, and some light; prices, from $5 per acre to $30. A good opening for small farms and large ones, quite convenient to New Westminster City, with one of the best markets on the Continent, which has to supply Vancouver largely.

CEREALS of all kinds are only produced in small quantities for feed.

ROOTS.—The same may be said of these crops, the product being mostly fed to dairy cows.

GRASSES, other than Timothy, are better for dairy purposes, but Timothy grows well here, as do all clovers except Alfalfa, and it is uncertain in catch. I am trying it with some more success this year.

INDIAN CORN.—Can be grown. A neighbour had some 6 to 15 feet high and heavy; wants lots of manure.

APPLES grown principally are the varieties enumerated on the south side, and about the same conditions, prices, etc.

PEARS AND PLUMS.—The same remarks apply.

CHERRIES.—The Royal Anne is most profitable, and fetches as high as 10 cents per pound.

DAIRYING is carried on in the district by private people, most of the milk being sold in the cities. There is a creamery in New Westminster, which obtains its supplies of cream from various points on the river.

SUMMER FEED is good, as pastures keep green all summer in fields after the hay crop is taken off.

SWINE not produced to any extent; prices, on foot, 6 to 8½ cents.

POULTRY production is profitable. Fowls fetch from $6 to $6.50 per dozen; eggs average 40 cents per dozen.

DYKING is being done, and we think successfully, on Pitt Meadows; but the pumps are not quite good enough to take off all the water falling as rain, when heavy.

NOXIOUS ANIMALS.—I object more especially to dogs as noxious animals, as they come in the night so much and worry so many sheep. Other animals kill to eat; dogs kill for sport.

LABOUR.—Whites, $20 and board; Chinese, about $20, without board; Japanese, $1 per day.

From Maple Ridge the following correspondents report, viz.: Hector Ferguson, Port Haney; J. M. Webster, Webster's Corners, and H. J. Percy, Wharnock:—

GENERAL DESCRIPTION.—Port Haney is situated on the north side of the Fraser River and on the Canadian Pacific Railway, 27 miles from Vancouver and 16 by steamer (daily) from New Westminster. There are about 50,000 acres of good agricultural high land (clay loam) tributary to it, and Pitt Meadows, containing about 20,000 acres, is only from two miles on the north to three miles on the west from it. It contains the Town Hall of the Municipality, two churches, two stores, two blacksmith shops, one waggon shop, a shoe shop, school and two large brickyards, which turn out about 3,000,000 bricks of all kinds per year, and furnish a splendid market for over 2,000 cords of wood per season to the settlers in the vicinity. The Fraser River at this point is a favourite part with fishermen, and many new settlers make enough in the fishing season to materially assist them during the remainder of the year in clearing up their places. All kinds of grain and roots, as well as grasses, do well here. Fruit, stock and dairying, with fruit growing, however, are the occupations of the future in this municipality. All kinds of small fruit, cherries, apples, pears and plums do exceptionally well here, and find a most convenient shipping place at Haney to all parts of the Dominion.

Wharnock is situated on the north side of the Fraser River, also on the main line of the Canadian Pacific Railway, 34 miles from Vancouver and 9 miles below Mission Junction. The land commences to rise almost immediately on leaving the river bank to benches or flats. The soil is mostly a dark sandy loam, with a hard clay subsoil. There is a good market at Vancouver and New Westminster, which can be reached by the Canadian Pacific Railway and river steamboats, and also a market is now open in the North-West for fruit. The game consists of grouse, geese, ducks and some deer. Good trout fishing in the Stave River and other streams. The salmon fishing industry employs a great part of the population in the summer time. There is a public school, post office, telegraph and C. P. R. ticket office, and two stores. There are 4 passenger trains daily and 3 passenger steamboats. The Stave River Power Co. has lately been formed to utilise the power of Stave River Falls, which are not far from Wharnock. There are prospects north of Wharnock waiting capital for development. The scenery around Wharnock is very beautiful. Mt. Baker and various ranges are to be seen.

OATS are one of the standard crops.

PEAS are the best grain crop grown here, and yield well where the land is not too wet.

POTATOES.—Maple Ridge potatoes, being mostly grown on high land, are of extra quality and command the highest price, and are grown quite extensively. Price, $15 to $20 per ton.

OTHER ROOT CROPS grown for feeding only.

FARM, LULU ISLAND.

SUGAR BEETS were tried here at one time, but abandoned; I presume more for lack of a market than for any other cause, as it is well known that beets do well here.

GRASSES AND CLOVERS.—All varieties of clover grow very luxuriantly, but Red clover is not grown as much now as it used to be, as, when made into hay, it has been found to produce red-water (no doubt on account of its coarse nature). I have found Orchard grass superior to all other grasses for pasture, and also good for hay when properly saved. I have cut green Orchard grass for feed every year for the last ten years, from the 25th of April to the 5th of May. I do not think Timothy is so much in favour as formerly, the Red clover being more suitable for the soil and not so exhausting, and easier raised where Timothy would fail. Timothy hay is good for stock, provided it be cured green; but when dried, seeded, bleached, hard and wiry, I have no use for it, and am sure stock hold the same views. The clovers are preferable for milk-producing purposes. Alsike is a clover which cattle eat greedily, stock, lock and branch; whereas the hard, woody, Red clover stalk they will not eat, unless starved into doing so.

INDIAN CORN is not a success for the grain. Some seasons it may come to maturity, but for ensilage it grows a fine crop. Perhaps an earlier variety than is generally planted here would prove more of a success where it is planted for the grain. There is the common yellow horse-tooth variety and white kinds being tried; the true names I am unable to furnish.

SUNFLOWERS.—I have grown sunflowers here a foot in diameter. Fowls are very fond of this food in winter, and, in fact, whenever they can get it. It is only grown in the gardens for ornament. I consider a ration of this seed occasionally for fowls far ahead of any other grain.

ENSILAGE.—There are several silos in this vicinity and they have proved very successful. Oats and peas, vetches and red clover are the principal crops grown here for the silo.

APPLES.—Although this is most decidedly a fruit section, many apple trees have died during the last ten years with bark blight, but for the last two or three years the blight has not been nearly so bad. Spy, King, Ontario, Red June, Wealthy, Duchess, Yellow Transparent, Hyslop, and Red Siberian crab are the principal varieties. Black spot on fruit and cut-worms were principal diseases and pests. Ruling price, 75 cents and $1 per box.

PEARS are proving to be a much more valuable tree on clay land than the apple, as the bark blight, although attacking it, does not go through the bark. Black spot on fruit and pear slugs are drawbacks. Remedies: spraying with Bordeaux mixture and Paris green, respectively. Price, from $1.50 per box for Bartlett to $1 for late varieties.

PLUMS AND PRUNES are perhaps the most extensively grown large fruit in this vicinity, all varieties doing well. Many thousands of trees have been set out during the last five or six years. Plum rot was rather prevalent this year. Prices about 60 cents per crate of 20 pounds.

SMALL FRUITS.—Points in this municipality being exceptionally favourable for growing and shipping, naturally, a large quantity of all classes of these fruits are grown and marketed.

DAIRYING is not carried on to any extent. No cheese is made. Butter is worth 25 to 30 cents per pound. Good opening, especially if people would erect silos and make butter during the winter months.

SUMMER FEEDING.—Corn and vetches have been found to answer well for late summer feed.

HORNED CATTLE.—Shorthorns for beef; Jerseys for dairying. Price of beef, 6½ to 8 cents, dressed. Milch cows, $35 to $50.

SHEEP.—The land here is generally too wet for successful sheep-raising.

SWINE.—Hog-raising is carried on to a considerable extent here, in connection with dairying. Prices have been from 7 to 8½ cents per pound, dressed. Breeds preferred, Berkshire for butchers, and Yorkshire for bacon. Do not recommend feeding down grain crops on field, as much of the grain is lost and the straw is likely to be troublesome to plough under.

Another report:—One farmer here says he has no trouble feeding hogs. He turns them into his pea field and allows them to fatten themselves. He claims that the time and expense of harvesting, threshing and handling the crop is thus saved, and the land left in fine condition for the next crop.

COLD STORAGE is required for use in connection with fruit raising, especially plums, early apples and pears, and I am inclined to think that with a little co-operation on the part of those interested these could be had at convenient points. We look to and depend too much upon the Government to build and maintain these places. Get a suitable site, let all contribute a trifle towards building; if the Government felt inclined to come in as a partner, well and good; if not, put up your storage; you are then independent.

EXPERIMENT STATIONS.—These are beneficial, but at the same time I think every farmer who attempts to experiment with crops of any kind should receive encouragement by bonus, premium or otherwise. By this means the whole place would be studded with experimental stations, and would save the expense of maintaining these so-called experimental stations.

AGRICULTURAL EDUCATION.—Agriculture should form a most important part of our public school education, on much the same principle as at present exists in Manitoba.

SOILS.—The soil generally in this district is a clay loam with clay subsoil, deficient in potash, and requires lime, which, however, is too dear to be used extensively.

FERTILIZERS.—These have not as yet been produced. People residing near the Fraser River have used the humpback salmon, which, when mixed with swamp muck, makes an excellent manure. Barnyard manure is always used when it can be had, but there are very few who realise the benefit of caring for it as it should be. A few people have proper sheds in which to keep it, where the excessive rains cannot drain all the valuable salts out of it before being hauled on to the land.

CLEARING LAND.—I only know of two practical methods at the disposal of an intelligent farmer of moving stumps, viz., with powder or machines. The old screw machines used in Ontario in pine regions would work well here. Cannot recommend pulling down trees, as every farmer who has cleared land knows that a stump turned up on edge is much more difficult to clean of dirt than one cleaned as it is raised from the ground. A large green stump should be blasted (sprung), and the parts taken out either by block and fall or by machines.

DRAINING.—Draining is not carried on to the extent demanded of nature here. Lack of capital is the principal drawback. Good drain tile can be had at Port Haney; 2½ in. at $10, 3½ in. at $15, and 4½ in. at $20 per 1,000. Twenty acres of land drained by me, at from 2½ to 3½ feet deep and 30 feet apart, has cost me about $45 for cedar and $35 for tiles per acre.

DYKING.—Dyking has been done on Pitt Meadows with marked success. The soil is black alluvial, inclined to be peaty in places.

PECUNIARY ASSISTANCE.—The "Cheap Money Act" is unworkable in this settlement, as no farmer will become responsible for his neighbour's management. What is required is a reliable, practical Government Commissioner to go round and place a safe value on property, make a direct loan to the individual (either to pay for improvements already made or to make new), and see that it is properly laid out.

TIMBER.—The principal timber here is fir, cedar, alder and hemlock. The bark of alder is held to be the best for tanning purposes, the wood about the best for fuel. It seems to follow and replace the other timber where cleared off.

POISONOUS PLANTS.—We have several plants quite prevalent of an acrid, poisonous nature, which is, no doubt, principally the cause of red-water in cattle, viz.: Bracken (commonly called fern), buttercup, wild parsnip, as well as many others indigenous to undrained, soggy land.

CUT-WORMS.—This worm, it appears, has invaded this section of country for the first time. The months of July and August seemed the time at which their ravages were first noticeable. Every kind of vegetation was assailed, peas, potatoes, carrots and cabbages; nothing appears to have been distasteful to them. The article written by Dr. Fletcher, Dominion Entomologist, is the best explanation of this pest. I boxed up a few of the chrysalis; they one and all developed into the moth in from three to four weeks' time. The damage to all kinds of crops has been about one-fourth of the whole.

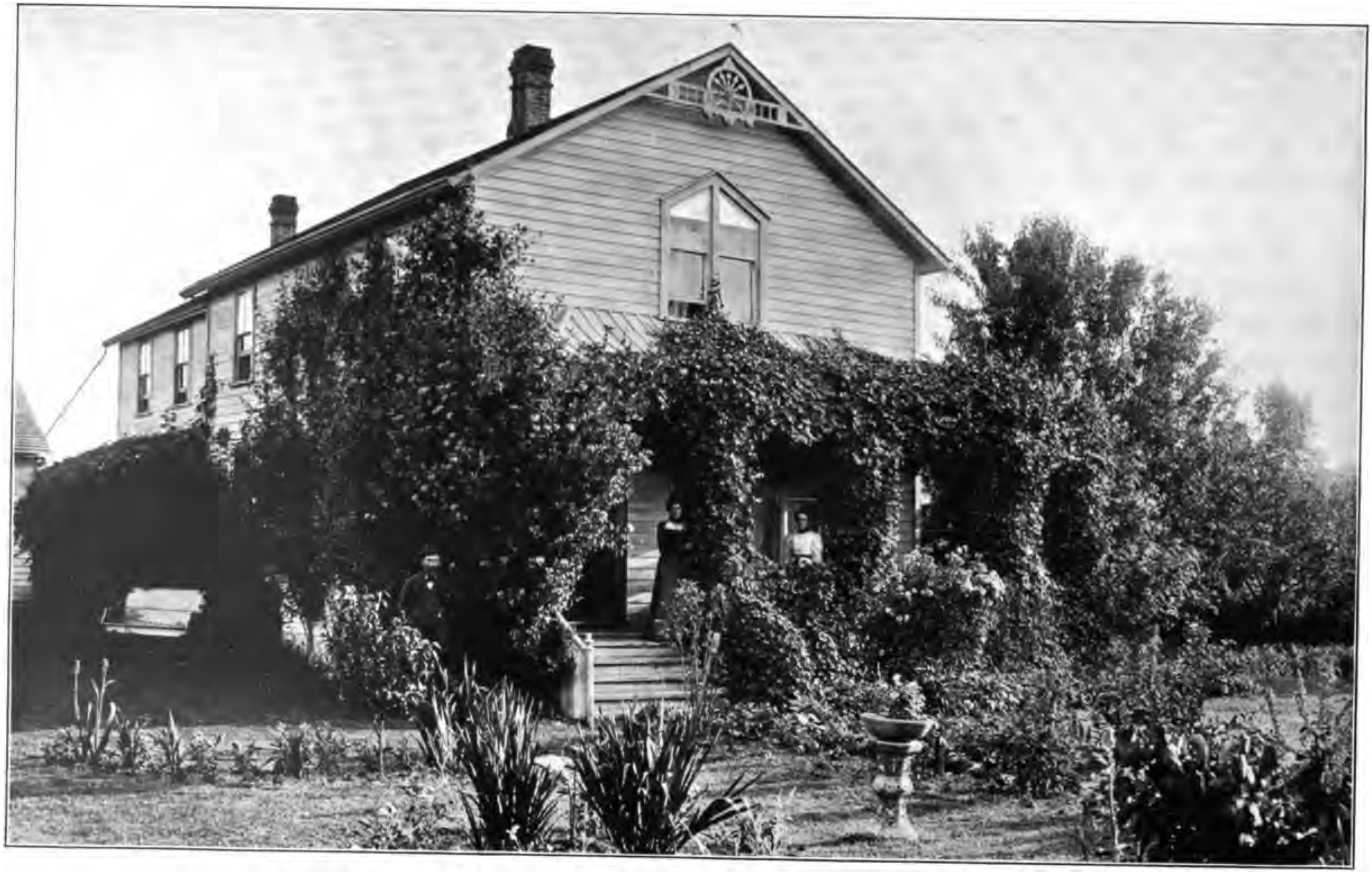
BUSH FIRES arise from various causes: setting fire to ferns by careless people, by camping-out parties, and clearing of land for agricultural purposes, which can only be accomplished in a dry season. It is next to impossible to stop fires when once started to run, on account of the resinous nature of the timber. Fire, when once in the tree-tops, which it soon reaches, is carried by the wind for long distances. Farmers, as a rule, try to prevent fires from spreading, as much for their own safety as for others' property.

LAND.—Little or no Government land. Improved land can be bought at from $10 to $50 per acre, according to location.

LABOUR.—Whites, easily procured, $2 per day, without board; Chinese, $1 per day, without board; Japanese, $5 to $15 per month, with board; Indians, about the same as whites.

Reports of A. M. Verchere and A. W. Peen, correspondents, Mission:—

The District of Mission Farmers' Institute comprises Mission and Dewdney Municipalities, thus extending from Stave River east to Nicomin Island, on the north bank of the Fraser



FARM-HOUSE, LULU ISLAND.

River. This stretch of country contains areas of lands of many varieties, and which, according to location, are good for many of the various lines of agriculture. The flat lands lying adjacent to the river, and but slightly above the level of the water during the season of the high water, consist mostly of heavy clay lands of a very rich and apparently almost inexhaustible nature. The lands on the higher ridges occurring frequently throughout these flats, and which are not subject to overflow, except on occasions of extremely high water, will bring in the best returns for all kinds of grain, hay and roots; and the large stretches of wild-grass lands that occupy all the lower part of these flats, and which are too low and wet, are especially valuable for pasture, and large numbers of cattle are carried by all the farmers thereon. On the lands rising back from the river towards the mountains, several miles in the background, the country comprises a great variety of soil, running, as it does, from heavy clay, where upland marshes occur, to light gravelly and sandy hillsides. The land throughout this section is mostly heavily timbered, although large sections may be found whereon the timber is very light and readily removed; but here still may be found old dead firs and cedars of great size of a past generation, lying fallen on the ground. The first are of little use except for firewood, and are hard to remove; but the latter are very valuable for making rails, boards and timbers for building purposes. These uplands, although thus slow to bring into cultivation, are more especially valuable for fruit growing; at the same time, after a little cultivation, good crops of all kinds of farm produce can be raised with surety and success.

Mission City, a small town on the river, gradually recovering from the evil effects of a boom some ten years ago, is the principal railway station and business point at this section of country, but there are flag stations at Nicomin and Ruskin respectively, at each end of the district, while there are post offices at Ruskin, Silverdale, Mission, Hatzic and Dewdney, all on the main line of the Canadian Pacific Railway, which runs through the section following the course of the Fraser River, and thus gives railway communication with all points on the Canadian Pacific Railway in Canada, and a branch line running south to Sumas, on the Boundary Line, connects with the lines on the American side for Seattle, Whatcom and San Francisco.

On the river, steamers ply daily between New Westminster and Chilliwack, thus giving communication by boat in either direction daily. These boats are of great benefit to farmers in the district, calling in, as they do, at any point to receive or deliver freight and passengers, and their charges are also extremely moderate.

Educational facilities are extremely good, there being a large school at Mission, from which many pupils have graduated into a High School, and also have successfully passed the examinations for school teachers. There are also schools at Ruskin, Silverdale and Dewdney, on the front, and at Ferndale and Hatzic Prairie on the back, districts. The country is well opened up along the river front and extending back for some miles with waggon roads, which, although not good, yet afford means of traffic and communication throughout the district. The chief direction of the farmers' efforts is along the low front lands, the raising of cattle, horses, sheep and hogs forming a considerable part of the production. Large quantities of hay and many tons of oats are also yearly shipped. The majority of these farmers also carry a large number of cows, the cream from which is shipped daily by boat to the creamery at New Westminster.

On the upland holdings, fruit growing and chicken raising form the chief items. The fruit industry of this section is assuming yearly larger proportions, and the district is rapidly becoming the largest fruit shipping district of the Province. Many tons of strawberries, raspberries, plums and apples, besides other fruits, are shipped yearly to the North-West, with remunerative results. The poultry business is as yet in almost an infant state, but there are already some good breeders of pure-bred stock, and what small business has been done has proved encouraging. Eggs throughout the winter bringing in the cities from 30 to 50 cents per dozen, and the demand for table fowls being always good, it can be seen that considerable expansion in this business is to be expected. Turkeys and geese prove especially profitable.

The religious status of the community is well looked after, and churches of all denominations are within the reach of all.

For those who have the inclination and time, shooting and fishing can be indulged in, the duck shooting and trout fishing being as good as can be obtained in the Province, and frequently a deer or bear falls a prize to the ardent sportsman.

The Fraser River affords occupation during the season for fishermen to take the salmon and sturgeon with which its waters abound, and considerable lumbering is done on the streams emptying into the Fraser, and work can nearly always be obtained in this line, if desired by those who are experienced woodmen.

The Government is building a trunk road from Vancouver to Agassiz, which will traverse the district from one end to the other, and will thus open up much desirable land which can be pre-empted for settlement. Much of this land, although first-class, is heavily timbered, but large tracts occur whereon the timber is but light and can be easily removed. The great need of the district is settlers to open up the back lands and to increase the production, and the establishment in the district of some one or more industries, for which facilities are especially good in Mission City. Lands can be purchased throughout the district, both on the low and uplands, in blocks of almost any acreage, at reasonable figures; and there is considerable land open for pre-emption, some two to three miles back from the river, and which will, in the course of a few years, be valuable properties.

The production of grain and roots is similar in conditions to those given under Maple Ridge, and do not, therefore, require repetition.

SUGAR BEET.—The production of sugar beet has been successfully attempted. Reports have been received that local grown beets are far superior in saccharine matter to those used for sugar production in California. I grow about half an acre of Danish beets for milch cows for winter dairying, for which purpose they are a splendid root. None is grown for the manufacture of sugar.

GRASSES AND CLOVERS.—Timothy, Orchard grass, Blue Joint, Red clover and Alsike are the principal ones grown. Timothy is one of the least nutritious grasses to grow, but it is stiff and tends to hold up the other. Brome, or Orchard grass, is far superior for dairy stock. I have grown Austrian Brome grass and it will produce a heavy crop on poor land. All kinds of stock eat it greedily. Blue Joint, which grows on marshy land, is the best native grass here.

INDIAN CORN.—This plant can be grown very favourably for fodder purposes. Weather for curing in large quantities very unfavourable, as stooks cannot remain in the field during the fall and winter, owing to excessive rain, and large quantities placed under cover are troubled with mould. For ensilage, however, very good results can be obtained.

VETCHES grow wild here. Sown with oats and cut green, they form an excellent summer soiling crop.

ENSILAGE.—This fodder is extending throughout the district, and is generally believed in. It is very profitable, as early and late crops of hay can be thus saved. Almost all green foods can be with benefit used: Red clover, green oats, barley or rye, which can be sown late after harvesting grain, or potatoes, and turnip tops, especially the large luxuriant tops of the white varieties. Peas sown too late to harvest before the fall rains commence are also profitable. In this wet climate, where so much crop is lost through rain, ensilage cannot be too strongly advocated.

FRUITS.—Same remarks apply here as in the previously mentioned municipality.

DAIRYING.—Considerable dairying is carried on, but cream is for the most part shipped by boat to New Westminster creamery. Considerable local butter is made, but very little cheese. Quality of butter for the most part is poor. Good profits are obtained. Creameries on the co-operation basis are one of the best institutions farmers have yet experienced.

CREAMERIES.—There are no creameries in this district. About 250 cows for milk supply are now available. Many more would soon be forthcoming if a creamery were located at some point near by. Both Dewdney and Mission residents have discussed and contemplated starting a creamery at their respective points, but as yet without material results.

FEEDING.—I run a dairy, summer and winter, keeping only Jersey cows. In summer I run them at pasture during the day and shed and protect them from the flies at night, giving them a slight feed. In winter they are stalled and fed, principally on clover hay, which must be free from mould or dust, cut young and properly cured. I supplement this with roots (sugar beet and carrots) and meal, fed in proper proportions, of course. I watch narrowly to see that they are always in health, so as to do their best.

SUMMER FEED FOR DAIRY CATTLE.—Irrigate and sow a crop of Italian Rye grass; five or six cuttings can be made in a summer. This is done on the irrigated sewage farms in England.

HORNED CATTLE.—This is a successful industry in this district. Prices, good: Cattle, beef, from 7 to 8 cents on foot; veal, according to quality, but generally good. Milch cows, good, from $35 to $50. Breeds recommended: Grade Jersey and Holstein for milk; beef, Durham, Polled Angus and Hereford; depends greatly on the animals.

SHEEP are very remunerative, and with good care and good covered shed for wet weather would well repay larger production, although it is uncertain whether cattle should be sacrificed to allow this.

SWINE.—Prices, 5 cents per pound, on foot; bacon, etc., at store prices, 14 cents to 20 cents per pound. The choice of breeds is according to location. On low lands, where grain and feed is plentiful, large breeds, as Yorkshire White, Cheshire White, Poland China and Tamworth; on uplands, where a small fast-growing pig is wanted, Berkshire and Suffolk. Very good results have been obtained by crossing Tamworth with Poland China, Berkshire and Chester White.

POULTRY.—This industry has been slightly taken up, and is a remunerative branch of agriculture. Breeds recommended: Brown Leghorn and Barred Plymouth Rock. Ruling prices, hens, $6 per dozen; chickens, $4.50 to $5 per dozen; eggs, 20 cents to 40 cents per dozen, according to season. Want of necessary buildings and expense of same are two of the reasons why this industry is not followed more assiduously; also price of feed and difficulty of producing ready supply of bone meal and grit. There are no causes which militate against its successful prosecution which cannot be easily overcome.

DISEASES OF ANIMALS.—Red-water in cattle appears to be the only prevalent disease.

CO-OPERATION.—The principle of co-operation has not attained a foothold amongst the farming population of this district, although, I think, it would be well received if once started. It is an undeniable fact that, owing to lack of unanimity, the farmers have been put to disadvantage as regards freight rates and transportation charges, on account of the want of proper facilities to acquire the knowledge, and they have been unable, when called upon, to express their wishes in an inteligent manner or press them upon the notice of their representatives. Any work, however small, in this matter, cannot but tend to accomplish some good.

EXPERIMENTAL STATIONS.—Some good would certainly be derived, but only if really good stock for breeding purposes, and grain, etc., for seed, could be obtainable when desired, and the latter in sufficient quantities and ordinary prices reachable by the average farmer. At present the country generally loses heavily by farmers breeding to inferior stock and sowing poor varieties of grain, etc., on account of not being able to pay the high rates charged for the good articles.

CLEARING LAND.—Blasting powder is the plan recommended for the removal of large stumps. Powder, understood and properly used, is the best and cheapest means of removing stumps. Stumping machines have been used with good success on small stumps. Powder will accomplish this more readily, and trees do not have to be ring-barked before throwing. A drawback in this respect is the uncertain direction where the tree will fall, and a tree falling in a bad place is more trouble to remove afterwards than the stump would be when the tree was felled. Also, large stumps thrown or torn up whole are hard to remove afterwards, whereas a blasted stump is nearly always shattered and can be readily removed with a team.

DRAINING.—Under-draining is very little carried on in this district, on account of general cost, lack of fall on low lands and general difficulty in uplands. On the latter very little is at present necessary, as the ranchers have for the most part evaded clearing land necessary to drain.

DYKING.—There is quite an extent of land in this district that could be reclaimed by dyking Dewdney and Hatzic Prairies. Character of the soil is clay. Hatzic Prairie was dyked by filling the Canadian Pacific Railway trestle over Hatzic Slough, but it broke away in 1894. The Canadian Pacific Railway track forms a natural dyke along the remaining portion. Cost too heavy to repay expenditure for amount of land reclaimed. Only very high waters flood these lands.

POISONOUS PLANTS.—Water hemlock is reported occasionally. Fern does no damage, provided ripe ferns that are not seeding when cut are put up with the winter feed. Cattle and horses do not consume the bracken itself, and the sickness is caused by the taking into the system the dust from the ripe seeds on the fern, which adheres to the food consumed.

CUT-WORMS.—Time of first appearance, about beginning of July. Everything was affected except grains. Peas, however, were almost totally destroyed. Disappeared beginning of September. Chrysalides were found in abundance in the ground throughout the fall.

NOXIOUS ANIMALS AND PESTS.—Mink, wild-cats and rats. Panthers very scarce and seldom seen. Bears do considerable damage in autumn to orchards, and some years destroy numbers of hogs. Mink and wild-cats very destructive to chickens. Rats along the river very numerous, and are increasing; do great damage to all stored crops, and destroy large numbers of young chickens and ducks.

LANDS.—There is both Government land for pre-emption and railway land to be had. Generally poor, heavily timbered, and far back from the river, and the lack of roads is very detrimental to settlement. Various prices; circumstances are so extremely different in locations which may be close together, that it is hard to estimate figures of valuation.

LABOUR.—Whites—Scarce in summer, at $2 to $2.50 per day; plentiful in winter, at $25 to $30 per month. Chinese—Plentiful; summer, at $1 per day; winter, 75c. per day, or $12 to $15 per month. Japanese—$5 to $15 per month in winter. Indians—Plentiful at good wages, but will seldom work except on contract or berry picking. White labour in harvest time is somewhat scarce and cannot be procured except at high wages.

Geo. W. Beebe, correspondent, Agassiz, reports:—

GENERAL DESCRIPTION.—Kent Municipality is located 62 miles east of Vancouver; Harrison River Station is located at the mouth of the Harrison River, where it empties into the Fraser. A large saw-mill, a shingle mill, two general stores, etc., comprise the settlement, with an Indian Reserve. Ruby Creek, the eastern boundary, is an Indian Reserve, with one store and station. Agassiz is the principal station in the municipality, and the most important along the Canadian Pacific Railway for many miles. The Dominion Government Experimental Farm is located directly opposite the C. P. R. station. Six miles north-west is the Harrison Hot Springs, hotel and pleasure resort, with Harrison Lake, nearly 30 miles long. Here is located one of the largest hotels in the Province. Agassiz Valley proper is a fine farming district of very limited area, almost entirely closed in on three sides by low mountains. Six or seven miles distant and across the Fraser River is the snow-capped peak of Cheam Mountain, that rises some 7,000 or more feet from the Fraser. Good stores, hotels, etc., are located at Agassiz Station, and excursion rates over the Canadian Pacific Railway are offered four days each week.

(Cereals, root crops and grasses as in other districts on this side of the river.—J. R. A.)

INDIAN CORN.—I always grow from one to two or more acres of Indian corn. There are many varieties that I have tested that will not ripen, but I find no difficulty in getting a variety called Longfellow, a Yellow Flint, to ripen most of its crop. No person need doubt about this variety not ripening sufficient for the use of stock or to put in the silo.

SUNFLOWERS.—One season I grew the Russian variety to use with corn in the silo. For some reason I found that wherever a quantity of the sunflower was unmixed, or only partly mixed, with the corn, there was always more or less musty or spoiled ensilage.

ENSILAGE.—I have the only silo in the district. I consider the ensilage a very desirable food, but where but one silo is to be filled I find it quite expensive to procure cutter and power, and have put clover in the silo without cutting, and have cured my corn in the field. I consider the round or barrel tank the most desirable, as there are no corners for the air to get in and spoil the ensilage, and with a little labour anyone can erect it. I have found Indian corn best for ensilage, and stock relish it when once using it.

HOPS.—Considerable quantities of hops are grown here, and averaged this year about three-quarters of a ton per acre. The crop is shipped partly direct to England, and the balance to eastern points. The hop-louse or aphis usually attacks the crop, but has not been as bad this year as it has been other years.

FRUIT same as in preceding municipalities in this district.

FEEDING.—Under the head of silos you will see I have tried to feed a balanced ration for milk and butter. So far I have not found any feed that is so well relished by stock as good corn silage, with a small quantity of oil-cake, say from one to two pounds daily, with a little bran and clover hay, and oat and pea hay for roughage.

SUMMER FEED FOR DAIRY CATTLE.—I use all the stubble land of clover and grain, feed root tops, etc., but usually have to hire pasture for a month or two each year, and in doing this I get a double benefit by securing the increase in milk and increase of growth of stock, and usually keep them in the barn lot at night.

SHEEP do fairly well here, but the business of raising them is not carried on to any great extent, though fairly profitable. I like the Leicesters, as their fleece is long and open and soon dries out after the rain. The carcass is large and sells for as much per pound as the smaller breeds.

EXPERIMENT STATIONS.—The Dominion Government Experiment Farm is located here. I don't think people consider or make use of the benefits offered; still, the climate of this Province is so peculiar that to establish these stations to benefit the whole Province it would require at least a half-dozen stations.

STRAWBERRY GARDEN, BURNABY.

AGRICULTURAL EDUCATION.—Many studies in the schools are forced upon the children that are practically of no use when they start out to earn a living for themselves. These children are placed on farms or lots of land, and of what use is their education without some knowledge of agriculture, when that is to be their life? The time is not far distant when agriculture will be the principal study of all our schools, both country and city.

FARMERS' INSTITUTES.—I am heartily in support of Institute work. I often wonder why farmers do not take a greater interest in this organisation. It seems to me that there is no work that should be encouraged by the Government to a greater extent than the Institute. How to get people more interested is the great drawback.

ARTIFICIAL MANURES are not generally used. I do not know of any being used except on the Government Experimental Farm and at my own place. These are procurable from the Victoria Chemical Works, Victoria, B.C., who quote prices per 100 or ton rates, and I have calculated what I propose using for 1901 will cost me as follows:—

Thomas phosphate powder	1,200 lbs.	$18	or $30 per ton.
Nitrate	450 lbs.	11.12	or 45 "
Muriate of potash	350 lbs.	9.62	or 55 "
	2,000 lbs.	$38.74	

WEEDS.—I believe that the "Canada Thistle Act" is not sufficient. The Canada thistle pest is a most serious one, and in spite of the people is spreading rapidly. I firmly believe that the Government should at once undertake, at its own expense, to eradicate this pest. The soil and climate seem suited to it, and in time it will overrun the country, unless some extra method is adopted to get rid of it.

LANDS.—Some very high mountain land, I am told, to be had; small quantities of timber lands to be pre-empted within ten to fifteen miles, good for farming purposes, I am informed.

LABOUR.—Whites, generally at $1.50 per day; Chinese, plentiful, at $1 per day; Japanese, a few, at 50 cents to $1 per day; Indians, a good many, but usually work by the job and hop-picking. Chinamen are in preponderance.

The North-West Coast of the Mainland,

Including the various settlements at Howe Sound, Squamish, Froek, Bute Inlet, Bella Coola, etc. Communication with these settlements is maintained altogether by steamers, there being no roads, and the character of the country being of such a nature that their construction is all but impossible, and must of necessity remain in abeyance until the population is sufficient to justify it. The country is without exception thickly wooded, principally with Douglas fir, spruce, hemlock, red cedar, balsam fir, maple, alder, birch, and other woods, and a great variety of under-brush. The coast line is indented along its whole length with deep fiords, which run many miles into the interior, and at the heads of which are large streams. The shores of these fiords are, except where rivers debouch, almost invariably precipitous. At the mouth of the streams and along their valleys are generally flats, fit for agricultural purposes after they are cleared of timber. As may be imagined from the description given, the precipitation is excessive, consisting almost entirely of rain, the snowfall, owing to the influence of the sea, being comparatively small, and the temperature from the same cause, never very low. The markets of this part consist mostly of loggers' camps and Indians.

METEOROLOGICAL RECORDS FOR 1900.

At Rivers Inlet:—

Highest temperature, June	81.0°
Lowest " February	17.4°
Rainfall	116.43 inches.
Snowfall	22.8 "

At Port Simpson:—

Highest temperature, July	72.5°
Lowest " November	14.0°
Rainfall	61.46 inches.
Snowfall	20.8 "

At Bella Coola:—

Highest temperature, July	92.0°
Lowest " February (incomplete)	7.0°

Precipitation incomplete.

Howe Sound includes all that part at the entrance of the Sound, including Anvil, Gambier, Keat's and Bowen Islands, where there are a good many settlers, principally engaged in fruit culture, for which this part is well suited. Communication is maintained altogether by water, the country being too mountainous for making a road to Burrard Inlet. The distance from the Sound to Vancouver by water is 10 miles, and to Nanaimo about 23 miles—these are the nearest markets. Very fine fruit is produced in this section, which finds a good market in Vancouver.

Squamish is a settlement in the valley of the river of that name, at the head of Howe Sound, about 40 miles by water from Vancouver. It is comparatively a sparsely settled district, and as it is heavily timbered, necessitates much clearing, and cereals are not produced to any extent; fruit raising and hop growing are found more profitable. The hops produced here are of excellent quality, and the land is well adapted to the purpose.

Mr. A. G. Deighton and Mr. N. Frolander, correspondents at Froek, which is a settlement at Malaspina Strait, about 65 miles from Vancouver, furnish the following:—

General Description.—There are no roads, trails or railroads; the only way of communicating one with another is by water. Fish and game in abundance. We want population, but we want inducements first, for anyone to settle on timber lands.

Potatoes are grown in fair quantities, the price being about $25 per ton.

Root Crops generally are grown for home use and for feeding.

Hay.—Timothy and Red clover are grown for home stock. Yield, about 3 tons of hay per acre.

Fruits succeed well if attended to.

Soils.—Potash is the main constituent lacking; it also needs lime.

Labour.—Whites, $2.50 to $3 per day; Chinese, 90 cents; Japanese, $1; Indians, $3. All without board.

Bute Inlet is about 130 miles to the northward of Vancouver. The climate is described by those who have visited the district as very equable, and the soil of excellent quality, but is timbered in some parts heavily. The Southgate and Homalko Rivers empty into the head of the Inlet, and it was the valley of the latter which was originally selected as the route of the Canadian Pacific Railway, and later for the proposed British Pacific. The natural difficulties are no doubt great, but not insurmountable for a railway or waggon road to the Chilcotin country. The settlers who have taken up land are well satisfied with their lot, and anticipate that a thriving town will spring up in the future. The land is wooded with alder, maple, cedar and a few fir trees. It costs from $30 to $40 per acre to clear and leave it ready for planting, not including the removal of stumps. There are some bottom lands up the Homalko River Valley, which would cost but $15 per acre to clear.

Bella Coola is at the head of Bentinck Arm, about 400 miles to the north-west of Victoria, with which communication is maintained by the coasting steamers, which all call there. A fine wharf has been constructed by the Government, and there is every facility for loading and discharging. Bella Coola has been established by a thriving colony of Norwegian settlers.

I quote the following from Mr. G. A. Gibson's last report:—

The Bella Coola Valley is situated inland a distance of about 60 miles from the coast line, and running eastward about 30 miles, with a gradual rise from the sea to an altitude of about 900 feet at the head of the valley.

It has a climate very different from what is generally found upon the coast, the humidity, even at the mouth of the valley, being much less than on the coast and, as the valley is ascended, it quickly changes to a drier climate, a marked difference being found even a few miles up from the head of the inlet.

FALLS, KANAKA CREEK, MAPLE RIDGE.

With regard to crops grown here, it has been fully demonstrated by the few settlers who were here for several years previous to the advent of the Norwegian colonists, that the various roots, vegetables and corn can be successfully raised, and of excellent quality. Wheat and oats have also been tried and proved very satisfactory.

It is, as yet, too early to say what kind of fruits, roots, grains and vegetables are most suitable until further experiments, but I feel sure the secret of success lies in giving due consideration to a judicious selection of the kinds required, taking into consideration the latitude, and climate so far as is known, also suitable and thorough cultivation.

The timber of this valley is varied, principally cedar, fir, spruce, cottonwood, alder, maple, birch and willow.

In compliance with your special request regarding clearing of land, I would say that it is very difficult at present to state the actual cost of such, and length of time required.

(*a.*) For clearing the heavily timbered fir land (covered with large trees), including the removal of stumps, so that the land can be ploughed, I would recommend blasting. Could not say as to cost and time required.

(*b.*) For clearing the same land of all timber, leaving the stumps, so that grass can be grown and fruit trees planted, about $100 per acre.

(*c.*) For clearing bottom lands covered with alder, willow, maple, birch, etc., including removal of stumps, about $100 to $125 per acre, without horse power or machinery.

Winter sets in generally the latter part of December. The winters are not severe, although the temperature has been as low as 10° below zero, but as a rule it seldom reaches lower than 12° above—that is, 20° of frost. Two or three feet of snow usually falls, chiefly in January. Sleighing lasts from six to nine weeks. From information gleaned, the winters are sometimes very open, with frequent rains. Spring sets in about the beginning of April, sometimes earlier. The clearing of the land will cause it to be much earlier, as the snow will not then remain so long.

Report of B. Brynildson, correspondent, Bella Coola, is as follows:—

POTATOES.—Average yield, 300 bushels per acre. The weather was partly cold and wet. Price, $20 per ton.

GRASSES AND CLOVERS.—Timothy is mostly grown for hay. I estimate the production to be 2½ tons per acre. Red clover is best adapted for this section of country, but in very cold winters will freeze out. Red-Top has been tried of late, with some success, and for the future I will recommend it, as it does not freeze out. Production, 3½ tons per acre. Price, $12 per ton.

INDIAN CORN has been tried, but without success, because the warm season is too short.

APPLES.—As this district is newly settled, not many apples have been grown. The yield this year was comparatively good and no diseases.

SMALL FRUITS.—The soil and weather seem to be favourable for all kinds of small fruits.

DAIRYING is carried on to some extent by private parties.

HORNED CATTLE.—The price of milch cattle is from $40 to $75. Durham and Holstein cattle are the most profitable in this district.

IRRIGATION is required some years. It is not carried on to any extent.

NOXIOUS ANIMALS.—The wolves are bad in winter, but never, so far, have they destroyed any animals. The bounty is quite sufficient.

LAND.—There is some Government land for pre-emption. Improved farms can be bought for $1,000 and up.

LABOURERS, white $2 per day.

VANCOUVER ISLAND AND ADJACENT ISLANDS.

———o———

Esquimalt, Highland, Metchosin and Sooke Districts.

These are the most southern districts in British Columbia, being at the extreme southern end of Vancouver Island, and lying very little above sea level. Access can be had to every part by one or the other of the following means, viz.: good waggon roads, railroad and water. The City of Victoria affords a market for the produce of this section.

The Districts of Esquimalt, Goldstream and Highland adjoin Victoria District to the westward, and much the same characteristics prevail as in Metchosin, Highland being more hilly and rocky and heavily timbered. Good waggon roads and the E. & N. Railway run through it.

Metchosin includes Rocky Point, Pedder Bay and Happy Valley, all accessible by water and by waggon road to Victoria, which is 15 miles from the centre of this district. A great part is covered with timber, mostly fir; some small second growth; some heavily timbered; some open oak land, and alder and maple bottoms.

Sooke includes Jordan Meadows, which lie some distance in the interior and are reached by a trail *via* Sooke Lake. Sooke proper is on the sea coast, with a good harbour for small vessels, but an indifferent entrance, a few miles to the northward, and westward of Race Rocks, and 23 miles from Victoria by waggon road or by water. The country generally is heavily wooded, rocky in parts near the coast, with open meadows up the Jordan River.

Mr. Arthur H. Peatt, correspondent, Colwood, reports that grain, except oats, is not grown largely. Wheat, principally for feed; price, $30 per ton; oats, from $25 to $30 per ton; peas, $30 to $40 per ton.

POTATOES produce 7 tons to the acre, and of good quality; price, $18 to $20 per ton.

OTHER ROOTS AND VEGETABLES.—Mangolds, 17 tons per acre, $8 per ton; carrots, 13 tons per acre, $10 per ton; turnips, 20 tons per acre, $10 per ton—troubled with aphis; onions, 350 bushels per acre, 2c. per pound.

GRASSES AND CLOVERS.—The principal grasses grown are Rye grass, Orchard grass, Timothy and Red clover. The yield was about 1½ tons per acre. I consider Timothy the very best grass for hay on low lands; on high lands, Rye, Orchard and Clover.

INDIAN CORN is grown for ensilage and fodder.

VETCHES are grown to a considerable extent, with very good results. It makes good feed for cows in the early spring and summer.

APPLES.—The most successful varieties are King, Baldwin, Salome and Duchess of Oldenberg. The yield was good in 1900; weather did not affect crop. Black spot was the only disease. Price, 1½c. to 3c. per pound.

DAIRYING is carried on to a considerable extent by private dairies, and is profitable, if properly managed.

SUMMER FEED FOR DAIRY CATTLE.—Oats and peas sown on moist land will keep a continuous supply the whole summer.

HORNED CATTLE.—Their rearing is a successful industry in this district. Beef was worth from 7c. to 9c.; milch cows, from $50 to $75. Shorthorns are recommended.

HORSES are profitable. I recommend Percheron as the best breed. Ruling prices were from $50 to $250.

SHEEP not very profitable, on account of wild animals and dogs. Downs are recommended. Ruling prices—lambs, from $4 to $5; sheep, from 10c. to 12½c. per pound; wool, 8c. per pound.

SWINE.—The raising of pigs is prosecuted. Ruling price, 6c. to 7c. per pound. Berkshire preferred.

Poultry Raising is being taken up with system and fairly good success. It is remunerative. The best breeds are Minorcas, Leghorns and Plymouth Rocks. Broilers are worth from $4 to $6 per dozen; hens, $6 to $9; eggs, 16c. to 50c. per dozen.

Farmers' Institutes.—I would like very much to see it arranged so that we could get purer bred stock of all kinds through this medium.

Fertilizers.—Artificial fertilizers are too expensive for general use. Barnyard and other manures are used, and care is being exercised.

Clearing Land.—The best agencies for clearing land are powder and fire. Clear the earth away from about the stumps, shatter with stumping powder and pull out fags with stumping machine. Clearing costs from $50 to $150, and even $200 per acre, according to timber.

Labour.—Whites, $20 to $40 per month; Chinese, $10 to $30 per month; Japanese, $5 to $30 per month. Supply equal to the demand.

The following is the report of Mr. John Muir, correspondent, Sooke:—

Some thirty-five families in this district engaged in farming.

Wheat is not produced for milling, only for feeding purposes; ruling price, 1¼ cents per pound.

Oats.—Any variety grows well. Average yield, 40 bushels per acre; not so good as in former years, owing to cut-worms.

Peas yielded 20 bushels per acre; also attacked by cut-worms. Price, 1½ cents per pound.

Potatoes.—Yield this year poor, owing to the ravages of the cut-worm; some fields totally destroyed. Average yield in fair years, 6 tons per acre. Ruling price $18 per ton.

Carrots yield about 15 tons per acre; were partially destroyed by cut-worms.

Turnips were nearly all destroyed by the same cause.

Grasses and Clovers.—Timothy and Red clover principally grown here; average yield, 2 tons per acre. Ruling price this year, $12 per ton.

Fruit of all kinds does well. The yield of apples was indifferent; plums good; others fair.

Sheep.—The district is suitable for the industry. It is carried on to a small extent and is profitable. Southdowns and Oxford Downs are recommended. Lambs were worth $3.50; sheep, $5, and wool 8 cents per pound. The presence of wild beasts militates against the success of the industry to a great extent.

Swine.—Not produced to any extent nor with any system.

Clearing Land is generally done by blowing out the stumps with powder.

Draining is not carried on to the extent it should be. Cedar is the cheapest and best thing we have for draining.

Noxious Animals and Animal Pests are panthers, wolves, coons and bears. The bounty on wolves is not sufficient; they are more destructive than panthers.

Land.—No Government lands open for pre-emption. From $6 to $30 per acre, according to location and improvements, is the price for improved lands.

Labour.—Whites, $1.50 per day; Chinese, $20 per month; Japanese, $10 per month; Indians, none. Supply equal to the demand.

Victoria, Lake, North and South Saanich, and including James Island.

These districts lie to the northward of the City of Victoria, and are connected with it by good waggon roads, railroad and water. The principal products are hops, roots, vegetables, hay, dairy products and fruit.

Victoria District comprises all that part between Esquimalt and Highland on one side and Lake District on the other. Victoria City, beautifully situated on the Straits of Fuca and extending to near Esquimalt Harbour, the chief naval depôt of the Pacific station adjoining this district, is the capital of the Province. A large portion of the land is slightly wooded and much of it partly open oak land.

Lake is a district north of Victoria and between it and South Saanich, the eastern boundary being Haro Straits. Most of the land is timbered, lightly in some parts and heavily in others. The district is well watered by streams and lakes. Fruit-raising and market gardening are principally followed.

South Saanich, on the Saanich peninsula, is about twelve miles north of Victoria, with which it is connected by good waggon roads and railway. Saanich Arm separates the peninsula from the main island, so that its eastern and western boundaries are the salt water, the south being Lake District and the north North Saanich.

North Saanich adjoins South Saanich to the north, and occupies the end of the peninsula. Sidney, the terminus of the railway from Victoria, is on the east coast. Several good waggon roads also give access to Victoria. This is a beautiful district, well suited to the cultivation of hops and fruits of all kinds.

James Island lies off North Saanich, and very near to it. The settlers cross in small boats with produce for the markets. Noted for the large quantity of strawberries produced, of good quality, and usually about the first of the local product in the Victoria market.

METEOROLOGICAL REPORT FOR 1900, AT VICTORIA.

Highest temperature (July)	79.6°
Lowest " (February)	18°
Rainfall	24.29 inches.
Snowfall	4.4 "

Report of Mr. C. E. King, correspondent, Victoria:—

"Hills and valleys" would best describe my district, the valleys having, as a rule, good, black, loamy soil, on which large crops can be grown. The hilly ground is inclined to be gravelly, and in many places is too rocky for cultivation. The City of Victoria, 3 to 5 miles distant, affords a good market for all the produce grown in the district; there are good waggon roads leading to the city; there are a sufficient number of schools and churches in the district; there is fairly good shooting of pheasants, grouse, quail and ducks. The people, as a rule, are industrious and in a prosperous condition.

Wheat.—There is a lot of fall wheat grown. The variety most favoured at present is Golden Chaff. Spring wheat does not do well. Price, $25 to $30 per ton.

Oats are grown; average yield, 42 bushels to the acre.

Other Grains not much grown.

Roots.—Root crops of all kinds are produced. Potatoes sell at from $18 to $20 per ton; mangolds, $6 to $10; carrots, $8 to $10; turnips, $5 to $7. Potatoes are of excellent quality.

Hay and Grasses.—The principal fodders grown are Timothy, Italian Rye grass, Perennial Rye grass and Red clover. Yield of hay, about two tons per acre.

Indian Corn can be successfully grown. It should be sown in drills about the last week in May, and given plenty of cultivation.

Rape and vetches are also grown.

Hops are produced in the Saanich peninsula, of extra good quality.

Apples generally grown are: Baldwin, Duchess of Oldenberg, Rhode Island Greening, Bellefleur and Gravenstein. Yield good. Price, $1 per box (40 pounds).

Pears of exceptionally good quality are grown. The following are the principal varieties: Bartlett, Autumn Butter, Louise Bonne de Jersey, Vicar of Winkfield. Price, $1 per box. No diseases or pests.

Other Fruits.—Plums, cherries and quinces are all grown very successfully, yielding heavily and not troubled with pests. Prunes are not grown to any extent. Peaches and apricots are successfully grown, if put on the south side of a building. Small fruits, especially strawberries, are grown in large quantities, and find a ready market.

Dairying is carried on largely and profitably in the sale of milk and also in butter-making. The Victoria Creamery has just started manufacturing butter. For dairy cows, bran and oilcake are the best feed, with plenty of clover hay. Oats and peas are a good soiling crop, and can be grown without trouble. Corn is also good.

Horses have been profitable, the demand having exceeded the production. Prices, $125 to $250.

Sheep.—This is a suitable district for sheep, and their production is carried on to a considerable extent with profit. No pests to contend against, except a few dogs.

Swine production is not prosecuted, owing to low prices prevailing of late.

Poultry production is being taken up with system and is remunerative. Minorcas, Leghorns and Plymouth Rocks are recommended. Prices of eggs range from 15 to 75 cents per dozen; spring chickens, 35 cents and upwards. The only cause militating against the success of the industry is "want of experience."

Clearing Land.—The cost of clearing land runs from $35 to $100 per acre. Blasting out the stumps is recommended.

Draining is very general. Tile-draining is best and cheapest. Tiles are manufactured in the district.

Entomological.—The cut-worm pest was bad in this district. They appeared early in July and lasted until about the end of August. All root crops and field peas were attacked.

Labourers.—Whites, $25 to $30 per month, with board and lodging; Chinese, $20 per month, without board; Japanese, $10 per month, with board and bed.

Cowichan,

Which includes the Districts of Cowichan, Comiaken, Quamichan, Somenos, Chemainus, Sahtlam, Seymour and Shawnigan, is one of the most flourishing settlements on the Island, about 40 miles north of Victoria, on the line of the E. & N. Railway, midway to Nanaimo, being centrally situated in regard to markets. The Flockmasters' Association, organised some time ago, has done good work in importing improved stock. The first two mentioned districts front on the water, Sansome Narrows; these, with the following two, have a fair quantity of comparatively clear land on the Cowichan River and on Quamichan and Somenos Lakes, with good bottoms and a good deal of timber lands. The others are farther back, and are for the most part heavily wooded and sparsely settled.

Chemainus adjoins Cowichan to the north, Thetis and Kuper Islands, which lie off Chemainus, being included. The latter are fairly cleared of timber, and are well suited to sheep-raising and fruit-growing. The mainland is heavily wooded, except in the valley of the Chemainus River. There is a saw-mill and quite a village at the harbour.

Cowichan Lake is centrally located between the eastern and western coasts of the Island, and about twenty miles from Duncans Station, on the E. & N. Railway, with which point it is connected by a good waggon road. The country is all heavily timbered, principally with fir and cedar and some maple and alder in the bottoms.

Shawnigan is a district on the line of the E. & N. Railway, about 30 miles from Victoria, and includes Shawnigan Lake and Koksilah River. The country is heavily wooded, but there are some extensive low-lying lands, which, with drainage, can easily be brought into cultivation. The drainage question, however, is a very serious one to the individual farmer, as the expense is great; and inasmuch as the draining of one part means the reclamation to some extent of all their properties, it would appear that co-operation should be adopted.

METEOROLOGICAL RECORDS FOR 1900 AT KUPER ISLAND.

Highest temperature, July	95.0°	
Lowest 〃 November	16.0°	
Rainfall	44.91	inches.
Snowfall	27.0	〃

Mr. H. deM. Mellin, correspondent, Somenos, reports as follows:—

General Description.—The Cowichan District, for the purposes of this article, comprises the valley watered by the Cowichan River, and the adjacent country as far south as Shawnigan, and to the north as far as Chemainus. This district is particularly adapted for the pursuit of both agriculture and horticulture. It is centrally situated on the Esquimalt and Nanaimo Railway, between two excellent markets, Victoria and Nanaimo. The soils, chiefly alluvial, submit readily to cultivation, and produce large crops of all grains and plants belonging to the temperate zone. The population consists chiefly of English and Scotch settlers, many of them of exceedingly good social position. The district is traversed by some of the best roads in the Island, kept always in good order by a well-administered Municipal Council. There is also good water communication along the coast from Saanich Arm to Chemainus. At the latter place may be found the largest saw-mill in Canada, and at Cowichan Lake extensive logging operations are carried on every year. Another rapidly-growing industry is mining. The ore deposits on Mount Sicker are now of proved value and immense extent. A tramway is in course of construction to carry the mineral to the sea, and a smelter is also to be built. In conclusion, it may, without exaggeration, be said that throughout the whole Dominion there cannot be found a district of fairer promise than that known as the Cowichan Valley.

CEREALS.—Little or no wheat grown. A considerable quantity of oats, of Ligowo, Lincoln and Danish Island varieties, grown; yield, about 60 bushels per acre; price, $25 per ton; a large quantity also cut for hay. Very little barley. Some rye cut green for milch cows.

PEAS.—Between thirty and forty bushels per acre. The crop had every prospect of being a good one, but, to a large extent, was much damaged by the cut-worm. Price, about $30 per ton.

POTATOES.—Varieties: Early Rose, Dakota Red, Maggie Murphy, Burbank Seedling, Beauty of Hebron, Clarke's No. 1, Everett, Puritan, Bovee and Carman. Yield from 400 to 600 bushels per acre. Potato rot and cut-worms caused considerable damage in some places. Prices, from $15 to $25 per ton.

OTHER ROOTS all grown successfully. Mangolds, about 30 tons per acre; carrots, 25 to 30 tons per acre; turnips, 35 to 40 tons per acre. Great havoc wrought by cut-worms in some places.

GRASSES, CLOVERS AND HAY.—Grasses: Timothy, Cocksfoot, Red Top, Meadow Fescue, Kentucky Blue Grass, Rye Grass. Clovers: Red, Mammoth Red, Alsike and White Dutch. Production of hay, from 2 to 3 tons per acre; price of hay, from $12 to $18 per ton. Timothy is not considered in this district to be by any means a satisfactory general-purpose grass. Pure Timothy is not much grown, but it usually forms the basis of the mixtures seeded down for hay. There is no doubt that a judicious mixture of Cocksfoot and Red Clover makes an ideal hay for dairy stock. The hay is usually ripe for cutting between the 15th and 30th of June. It is the experience of the farmers of this district that settled weather cannot be expected before the 1st of July, and by this date the Cocksfoot is usually over-ripe and wiry. In consequence, this mixture does not find much favour here, except, in one or two cases, for ensilage.

INDIAN CORN can be successfully grown in this district, and makes most excellent ensilage. The only bar to its general cultivation is the considerable outlay necessary in the construction of silos, and the purchase of the plant and power, etc., for cutting and carrying the ensilage.

SUNFLOWER.—In two cases, small patches have been successfully grown to cut and mix with ensilage.

DWARF ESSEX RAPE is grown to a limited extent, and used for pasturing sheep.

VETCH has been grown for some years past, in combination with oats, and cut for hay. This year several farmers have put in Fall Vetch with Fall Rye, to cut as a soiling crop in the spring. Shall be happy to give results in my next report.

NATIVE GRASSES.—A gentleman at present living in this district, who also has a farm near Nanaimo, has experimented for a number of years with native grasses. He finds that the natural inclination of most of them is to grow in single stalks or tufts. When grouped together in a plot, they show a poorer growth. So far, he has not succeeded in making satisfactory hay of any of the sorts he has tried.

ENSILAGE.—Mr. G. T. Corfield has, for a number of years past, made and used ensilage with excellent results. Large silos, requiring a cutting plant for the ensilage, are, however, not suited to the general run of small farms in this district. There is no reason, though, why small stave silos should not be used almost universally. Mr. Hadwen has had one constructed at a cost of $60, and this, filled with clover, he has operated for the past three years most successfully.

APPLES.—Varieties most successful in the district: Duchess of Oldenberg, Alexander, Wealthy, 20-ounce Pippin, Gloria Mundi, Gravenstein, Blenheim Orange, Ribston Pippin, Baldwin, Northern Spy, Golden Russet, Rhode Island Greening, Ben Davis, Canada Reinette and King of Tompkins County. Yield in 1900, fairly good; weather, good. Approximate number of trees, 10,000. Diseases, etc., scab and the cut-worm. Remedies, spraying; bands of tin against cut-worm. Prices, 75c. to $1 per box, rising to as high as $1.90 in the spring.

PEARS.—Varieties: Bartlett, Beurre d'Anjou, Flemish Beauty and Louise Bonne de Jersey. Yield, fairly good; weather, good. Number of trees proportionately few as compared with apples. Diseases, fusicladium and fungoid pest.

PLUMS AND PRUNES.—Varieties: Peach plum, Greengage, Pond's Seedling, Yellow Egg and Coe's Golden Drop. Yield, very good; weather, good. Approximate number of trees, 2,000. Very free from disease this year. Prices, from 2c. to 4c. per pound for certain varieties. For the greater bulk of the plums grown there is no sale whatever.

HAY FIELD, SAANICH.

Cherries.—Varieties: White Heart, Governor Wood and Royal Anne. Yield, good; weather, good. Number of trees, about 500. Prices, from 4c. to 6c. per pound.

Peaches, Apricots and Nectarines.—With care and cultivation, all these fruits can be successfully produced here. There are, however, very few trees in the district.

Quinces.—Variety: Orange quince. Yield, good. Comparatively few trees.

Small Fruits.—Most small fruits do very well in favourable seasons. Gooseberries—yield, good; price, 4c. to 5c. per pound. Currants—yield, good; price, 4c. to 5c. per pound. Raspberries—yield, good; price, $1.50 per 24-pound crate. Strawberries—yield, good; price, 6c. per pound. Varieties: Gooseberries, Oregon Champion; Currants, White, Red and Black; Raspberries, Antwerp and Cuthbert; Strawberries, Sharpless, Wilson and Warfield.

Dairying.—Private dairying does not prove as profitable as formerly in this district. The Cowichan Creamery now includes as patrons all the larger farmers who had a reputation for their butter. This creamery has been so successfully worked that it does not pay the average farmer to do his own churning, if he can by any means manage to send the cream into Duncans. Last year the creamery manufactured 71,111 pounds of butter. There are 53 patrons, who have, altogether, about 450 cows. The number of cows available for creamery purposes within a reasonable radius will amount altogether to about 650.

Sheep.—Cowichan District is very suitable for sheep raising. There are many valuable and extensive mountain ranges, well provided with sweet and nutritious grasses and herbs, and good shelter during rough weather. The cleared ranches on the lower levels are also well adapted for carrying sheep, and no rancher should be without a flock of these useful animals. The industry is carried on to a fairly large and increasing extent, and it is profitable. After a number of years' experience by the Vancouver Island Flockmasters' Association, Southdowns and Shropshire Downs have proved the best suited for the majority of our lands. The larger breeds (Oxford Downs seem the favourite) being, perhaps, more profitable on the alluvial or river bottom and delta soils. The prices paid by the butchers for the sheep raised here this year were: Wethers in good condition, from $5 to $6; good grade ewes for stock, $6; lambs, from $4.50 to $5; wool, 7c. Panthers in the outlying parts of the district, dogs, want of drainage on some ranches, causing fluke, etc., and many ranchers running their farms for dairy purposes solely, are the principal drawbacks to success.

Swine.—The raising of pigs is carried on on most farms as part of the system of mixed farming. The ruling prices during the year have been: For pigs on foot, from 5 to 6 cents per pound; dressed, from 8 to 9 cents. Of late, Chester Whites have been greatly in favour in this district, and a cross between this breed and Berkshires, or Tamworths and Berkshires, have both been found to give excellent results.

Poultry raising is not prosecuted with any great degree of system, or on a large scale, anywhere in this district. This, too, in spite of the fact that it is one of the most remunerative branches of agriculture. Eggs vary throughout the year from 20 to 60 cents per dozen, and there is always a sale for them; if not here, at any rate in Victoria and Nanaimo. Chickens, from $3 to $6 per dozen. The breeds most recommended are Wyandottes and White Plymouth Rocks. Coons, minks, hawks and owls cause a certain mortality, and unless great care is exercised, fowls are apt to suffer from liver complaint. There is, notwithstanding, a decided opening here for a man who will devote his whole time to the careful management of a poultry ranch.

Diseases of Animals.—It is only very rarely that any diseases of a contagious nature occur here. Of other kinds, the not-sufficiently-well-understood complaint of "staggers" occasionally finds a victim among the horses. This, as a rule, occurs in the early spring, and is supposed to be caused by fern in the hay. How best to counteract the bad effects of the fern, or how best to treat the animal when once the complaint has taken firm hold upon him, are matters upon which it is urgently needed that we should receive more enlightenment. At present, also, it is rather a drawback that we haye no veterinary surgeon in the district. For serious cases one has to be summoned at great expense from Victoria.

Co-operation.—The principle of co-operation is certainly obtaining a foot-hold here. The Cowichan creamery already affords a standing example of what can be done in this direction; also the Vancouver Island Flockmasters' Association, whose headquarters are at Duncans. The farmers in this district have invariably been found ready and willing to combine for the furtherance of any scheme for the benefit of the community.

Experiment Stations.—It has been the opinion of people here for some time past that an experimental farm for Vancouver Island is greatly needed. In this connection it may be pointed out that, on account of its central position and exceptional advantages, the Cowichan valley has much to recommend it for the establishment of such a station.

AGRICULTURAL EDUCATION.—Some elementary text-book on this subject should certainly be introduced. This may not be desirable everywhere, but in districts such as this, where the bulk of the population is engaged in agricultural pursuits, it would be an excellent innovation.

SOILS.—The soil throughout the greater part of this district has been found to be lacking in lime. Beneficial results have invariably been found to follow the use of lime as a top-dressing, or when applied to the roots of fruit trees.

CLEARING is carried on, following the usual methods of slashing, burning, logging and the extraction of the large stumps by means of stumping powder and dynamite. No effectual novel measures have, to my knowledge, been introduced. It is a matter of surprise that science has not so far devised a cheaper and more effectual method of stump extraction. The stumps are, after all, the greatest hinderance to effective clearing in this country. Contract prices for clearing, whether by whites, Chinamen or Indians, vary from $60 to $100 per acre, according to timber.

FERTILIZERS.—No artificial manures used. Barnyard manure, as a rule, carefully looked after and systemtically employed.

DRAINING.—Farm lands fairly well drained, as a rule. Usual price for ditching: ditch 2 feet deep, filled in with cedar slabs, from 40 to 50 cents per rod.

DYKING.—Some dyking at the mouth of the Cowichan River. Otherwise the character of the land in the district is not such as to require dyking.

PECUNIARY ASSISTANCE.—It is doubtful if direct pecuniary assistance to the farmer is really of much avail. Government loans and subsidies are probably better expended in helping on enterprises of a co-operative nature, such as the building of creameries, pork packing and fruit preserving factories, and the importation of improved stock. Certain chemicals have been recommended for the destruction of stumps. If the Government were to conduct some careful scientific investigations along this line, valuable information might be gained, and perhaps new discoveries made.

TIMBER.—Trees are Douglas fir, balsam, hemlock, red cedar, yellow cedar, white pine, yew, arbutus, crab, wild cherry, alder, maple, dogwood, willow (several varieties), oak and cottonwood. All the trees are in abundance, except yellow cedar, white pine and yew.

POISONOUS PLANTS.—The only domestic animals apparently sustaining any ill effects from the consumption of fern, are horses. Fern is supposed to act upon them more injuriously when dried and old, than when young and green. It would be decidely interesting and instructive to farmers to know exactly what effect this plant has upon horses, and what remedies can be given. There is plenty of water hemlock, but it is only very rarely that cattle eat it. (I allude to this in another part.—J. R. A.)

ENTOMOLOGICAL.—The cut-worm (*Peridroma Saucia*) is the only new pest; it first appeared in June, and finally disappeared about the end of August.

FOREST FIRES.—It is rarely that destructive forest fires are caused by any act on the part of a rancher. It is a well-known fact that careless campers-out and Indians are, as a rule, responsible for the fires that cause most damage. If the "Bush Fires Act" were rigorously enforced, agriculture in sparsely settled districts would be much retarded. A rancher ought to be allowed to fire his chopping at any time after his own and his neighbours' crops are in, the firing being, of course, at his own risk, and subject to all possible precautions being taken.

LANDS.—There is no Government land for pre-emption in any easily accessible part of the district. Most of the railway land available for agricultural purposes has also been disposed of. Such railway land as remains unsold, in outlying parts of the district, may be bought for from $3 to $5 per acre. Improved farms, usually including a considerable amount of bush land, about $50 per acre.

LABOUR.—Whites, $1.50 per day (not easily procurable in busy season); Chinese, $10 to $20 per month; Japanese, $8 to $15 per month; Indians, $1 to $1.50 per day. Throughout the summer months white labour is scarce, and Mongolians often expensive. The Indians go to the canneries.

In view of Mr. Mellin's very exhaustive report, I only make the following excerpts from the report of Mr. P. Johnston, Westholme, near Chemainus:—

We have good local markets in the village of Chemainus and the Mount Sicker mines for most farm products.

GRASSES AND CLOVER.—The chief grass grown is Timothy, with Red clover and a little Alsike. Yield is about 2 to 3 tons per acre. Price in 1900, about $15 per ton. Timothy sells readily, but Red clover is better for home use. Frequently two crops of Red clover are cut in one year.

SMALL FRUITS.—Raspberries are most largely grown; yield, 4,000 to 6,000 pounds per acre. Strawberries, gooseberries, currants, etc., grown on a small scale. Price, about 5 cents per pound.

LABOUR.—Whites, very few wanted for farm work; Chinese, procurable; $1 per day without board; Japanese, procurable; $10 to $15 per month, with board; Indians, procurable; men, $2 per day; women, $1 per day, without board.

Mr. Chas. Bayly, Cowichan Lake, reports:—

Farmers on north side of lake are going in for general farming. Cattle, sheep, roots, cereals and fruit all do well. There is a fairly good road through the settlement. Settlers are increasing, and manage to make ends meet. There is plenty of room for a good settlement on the south side of the lake.

North and South Nanaimo,

In which is included Oyster, Cedar, Bright, Cranberry, Nanaimo, Douglas, Mountain, Wellington, Nanoose and Cameron Districts, and the Islands of Gabriola, Lasqueti and Texada, is the chief coal-producing section of the Province.

METEOROLOGICAL RECORDS IN 1900.

At French Creek:—	
Highest temperature, July	83.0°
Lowest " February	14.0°
Rainfall	41.32 inches.
Snowfall	15.0 "
At Nanaimo:—	
Rainfall	51.29 inches.
Snowfall	16.00 "

The following excellent report of Mr. John Stewart, correspondent at Stark's Crossing, Nanaimo, enters so fully into a description of this part that I refrain from further observations:

The Electoral District of North and South Nanaimo extends from Chemainus on the south to Qualicum on the north, a distance of 60 miles. The district, except what has been cleared, is all bush land, with mountainous, rocky ridges around Oyster Bay, Extension, Wellington, Nanaimo, Nanoose Bay and Englishman's River. The Esquimalt and Nanaimo Railway, which extends from the City of Victoria, at the south end of Vancouver Island, to Wellington, a distance of 78 miles, has 28 miles of track in the district. The town of Ladysmith, which is little more than a year old, is situated 5 miles from the south boundary of the district, on Oyster Harbour. Ladysmith is the shipping point for the Extension and South Wellington coal mines. The Extension coal mines are situated 12 miles to the north-northwest of Ladysmith, and South Wellington 9 miles to the north. The mines are owned by the Esquimalt and Nanaimo Railway Company, of which Company the Hon. the Premier of the Province is the President. The town of Ladysmith is built on sloping ground, which rises gradually from the water front back as far as the city is at present built, five or six blocks. It has a beautiful situation, one terrace rising above another. The city is well laid out and has a splendid water supply. There are two large hotels and several smaller ones already attending to the wants of the travelling public. There is one large departmental store and several smaller ones. It is a station on the Esquimalt and Nanaimo Railway, and has a post office with a daily mail service. Going north on the Esquimalt and Nanaimo Railway from Ladysmith, the first station is Fiddick's Junction, where the railway branches off to the Extension mines. The branch line is 3 miles long. The coal of the Extension mines is taken out through a tunnel 2 miles long. This tunnel is 8 feet by 8 feet, and accommodates two lines of rails. The coal is hauled out by two electric motors. The most improved appliances and machinery have been put in for the rapid handling of coal, and it is expected this mine will soon have an output of 1,000 tons a day. The Extension village has 400 or 500 inhabitants.

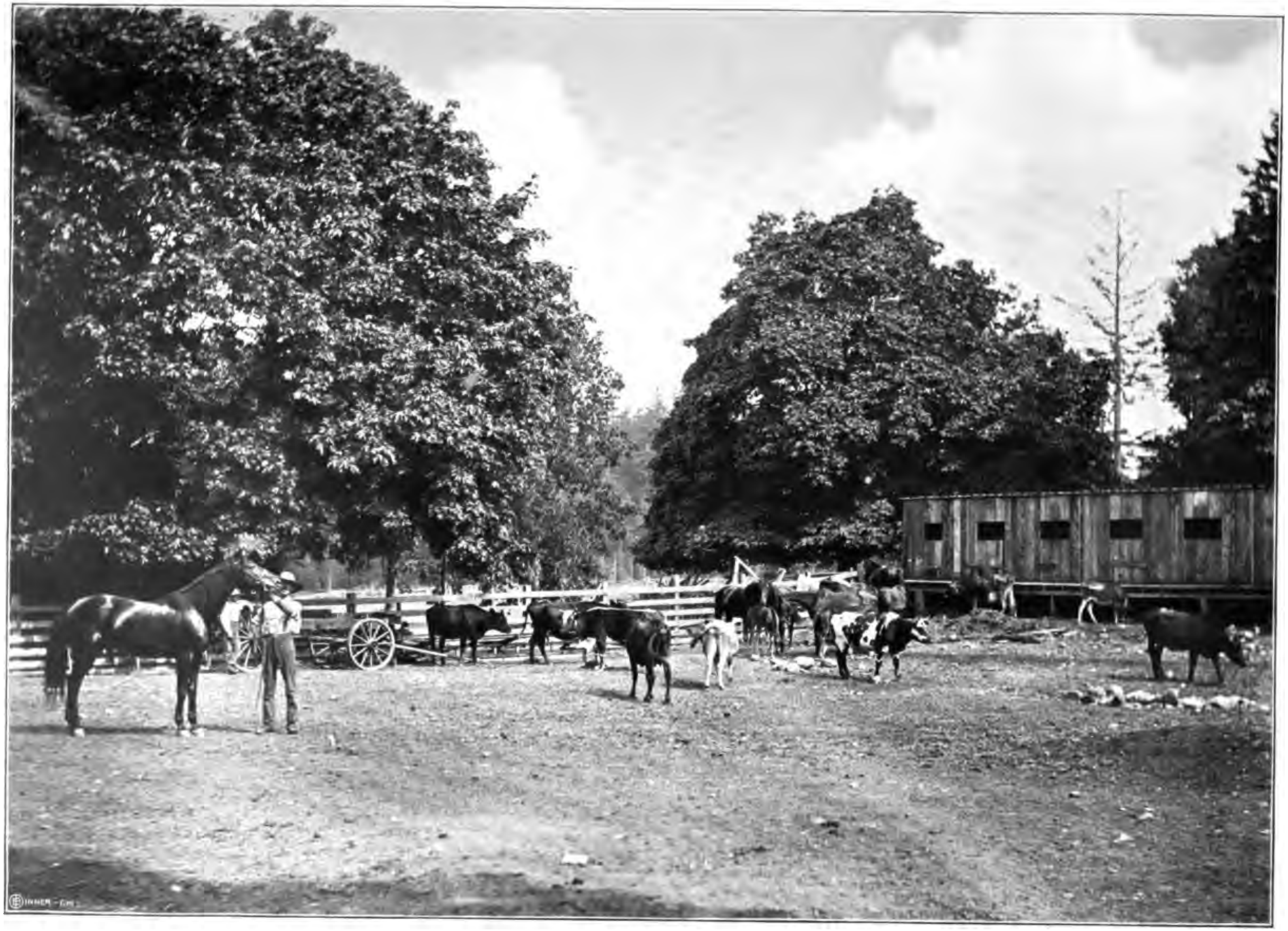
The site has been badly laid out and the streets are bad. It is a good market for butter, eggs, fruit, etc. The first station north of Fiddick's Junction is South Wellington, at which place a coal mine is in operation, the coal being especially adapted for steam purposes. There is a small village of recent growth, with between 200 and 300 inhabitants.

Along the water front from the south boundary, between the railway and salt water, there is partially cleared land as far as Haslam Creek, and the soil is good clay loam. From Brenton Crossing, 3 miles to the north of Ladysmith, following the waggon road to Nanaimo, there are a number of well-cleared farms. In Cedar District, which extends from near Oyster Bay to Nanaimo River bridge, the soil is all good, and would give returns if it were further improved by tile draining and good cultivation. Dairying is carried on on a small scale, but grain, potatoes and hay are the principal products of Cedar District. Nanaimo is the principal market for this district. The roads are good. To the west and south of Nanaimo are situated the 5-acre lots of the New Vancouver Coal Company, which have been mostly taken up by miners. To the west of Nanaimo, about 1½ miles, the New Vancouver Coal Company's farm is situated. This farm, of fully 500 acres, has been cleared up within the last 10 years out of the bush, some of it costing fully $200 an acre to clear. It is all drained with tile. It grows the supplies of hay, oats and roots for the Company's mules and horses. Nanaimo is a city of 6,500 inhabitants, and is a good market for all farm produce. The principal mine of the New Vancouver Coal Company is situated within the limits of the city. The Company has two other mines in operation at present—No. 5, four miles to the south, on the Victoria Road, and Protection Island mine, which is situated at the entrance to Nanaimo harbour. Following the Comox waggon road from Nanaimo to Nanoose Bay, the nearly deserted villages of Northfield and Wellington are situated thereon, the former 3 miles and the latter 5 miles from Nanaimo. To the south of Wellington, in the Millstream valley, the large farm belonging to R. Dunsmuir & Sons, with an area of several hundred acres of excellent land, is situated. The Company raises hay on this farm for the use of the mules and horses in their employ. At Northfield, the Hamilton Powder Company have their works. They manufacture gunpowder, blasting powder, stumping powder, dynamite and gelagnite. The product of these works is shipped to all parts of the Province. There is a naval powder works about starting operations near the Nanaimo River bridge, on the Esquimalt and Nanaimo Railway.

There are many small farms, well cleared and with good soil, between Nanaimo and Nanoose Bay. From the point where the Comox Road comes into view of Nanoose Bay and Parksville, the soil is inclined to be sandy and gravelly. Following the Comox Road from Parksville, by French Creek, to Qualicum, the best farming land in the whole district is found at Qualicum. Turning off the Comox Road 3 miles to the south of Englishman's River, near Beaver Creek wharf, the Alberni Road runs through a bush country mostly. The stage coach to Alberni has its headquarters at Errington, 3 miles from the junction of the Comox and Alberni roads. There is excellent shooting and fishing around Parksville, Nanoose Bay and Qualicum, and there is excellent hotel accommodation at Parksville, Errington, Nanoose Bay and Qualicum. There are three islands in the Gulf of Georgia which belong to the district, viz., Gabriola, Lasqueti and Texada. Gabriola, especially the south end, has excellent land; when cleared, it will yield large returns. Lasqueti Island is essentially adapted for sheep-raising, but the methods followed are not productive of the best results. Texada, the farthest north, in the Gulf of Georgia, is a great mining centre. Copper and iron are abundant, with gold and silver in less paying quantities. These islands, with the exception of Lasqueti, have steamboat communication three or four times a week. Texada Island has a smelter in operation for reducing the ore of the mines of the island and surrounding country. There is excellent school accommodation in the district—in all, there are 19 schools scattered up and down the district, exclusive of Nanaimo City. There are seven post-offices with a daily mail, viz., Ladysmith, South Wellington, Extension, Departure Bay, Northfield, East Wellington and Wellington; five with a twice-a-week service: French Creek, Parksville, Errington, Gabriola and Texada; and two with a once-a-week service: Cedar and Nanoose Bay. There are seven telegraph offices in the district: Ladysmith, South Wellington, Extension, Northfield, Wellington, Englishman's River and Nanaimo.

GRASSES AND CLOVERS.—Timothy largely grown; in a few cases, English rye grass has been grown, with good satisfaction; also White and Red clover and Alsike. Timothy hay is selling for from $12 to $15 a ton.

INDIAN CORN.—It is becoming evident that corn can be grown in this Province. A Mr. Cook, of Nanaimo City, was awarded a prize for corn at the recent Paris Exhibition. The



FARMYARD, SAANICH.

sample bundle of corn which he sent was 14 feet in length. R. J. Craig, of Parksville, grew corn (Mitchell's Extra Early) this year which nearly ripened. Sam. Waddington, Nanaimo, was also successful in growing corn this year, and was awarded a prize at Nanaimo Show.

VETCHES.—Wherever the right variety is sown at a suitable season, vetches (winter variety, *vicia sativa*) have given splendid satisfaction. The retail price of vetches here, which has been 10c. to 12½c. a pound, has been a barrier to a more extended trial. The Farmers' Institute or Department of Agriculture should import and distribute seed at cost price.

SOY BEANS have been a complete failure; English horse beans should be tried here.

ENSILAGE.—One man on the 5-acre lots tried ensilage, but made a failure of it. The great barrier to the adoption of the method is the cost of the ensilage cutters and power. If we had Experiment Stations on Vancouver Island, the problem of ensilage and the right kind of fodder plants would soon be solved. As far as my knowledge goes, nobody has a silo in use in this district.

APPLES.—Gravenstein, Jonathan, King of Tompkins County, Walbridge, Wealthy and Lord Suffield are the favourites. The crop was good for 1900. The wet summer produced a lot of apple scab. The black spot on the bark seems to be a little troublesome, but fruit growers are adopting the remedies recommended by lecturers at Farmers' Institute meetings, and these remedies are found to be very efficacious. The cut-worm did some damage in a few places, where the trees were not protected by a band. The oyster-shell scale is found on trees that are not periodically sprayed, and the same may be said of other pests.

PEARS.—Bartlett, Louise Bonne de Jersey, Flemish Beauty, Winter Nelis and Beurre d'Anjou. The yield was good, but pears are only grown on a very small scale, because prices don't rule nearly so high as apples. The prices were 75c. to $1 a box.

PLUMS AND PRUNES.—Peach, Columbia, Bradshaw, Victoria, Black Diamond, Pond's Seedling, Yellow Egg, Italian Prune, French Prune and Pacific Prune. Winter-killing and black spot on the bark are the worst diseases. From the middle of August until the first week in September plums were a glut in the market, but after that they moved freely at 3c. and 4c. a pound.

CHERRIES.—Black Tartarian, May Duke, Late Duke, English Morello, Ontario, Preserving and Belle Magnifique. The worst disease of the cherry is gumming. The early sorts this year got completely spoilt with the rain. Late sorts sold readily at 8c. to 10c. a pound.

STRAWBERRIES.—Magoon, Sharpless, Wilson, Warfield, Gandy and Glen Mary. Yield, 2 to 4 tons to the acre. Diseases, rust and winter-killing. Remedy for rust, spray with Bordeaux mixture; for winter-killing, only plant varieties that will stand the winter. Gandy is very subject to winter-killing. Price, 7½ to 10 cents per pound.

RASPBERRIES—Cuthbert and Marlboro; about 2 tons to the acre; 4½ to 8½ cents a pound. The Cuthbert was affected with an unnamed disease which affected the bark, but did not affect the yield, except in a very small area.

CURRANTS.—Not worth planting now, the demand growing less every year. I will pull the most of my currant bushes this year.

GOOSEBERRIES.—Industry and Oregon Champion; yield, 2 to 3 tons to the acre, on 3-year-old bushes. Prices, 5 to 8½ cents a pound. Mildew is the most persistent disease, but yields to remedy of lime, sulphur and salt and Bordeaux mixture.

BOARD OF HORTICULTURE.—If the Report of the Board of Horticulture, as provided for in section 13, were published, we would be able to judge better of its workings. The Board of Horticulture or the Government should appoint some person in every city where fruit is sold to see that Rule 8 is carried out. In every city that I have been in recently, Rule 8 is more honoured in the breach than in the observance. Fruit sellers that break the rule should be warned first; then, if they don't pay any heed to the warning, prosecute. (Rule 8 requires growers to stamp packages with their names.—J. R. A.)

DAIRYING.—All through the district, but especially in the neighbourhood of Nanaimo, dairying is carried on. Around Nanaimo dairying is fairly profitable, but not nearly so profitable as it should be, because they fail to keep tally with their cows, or, in other words, they fail to "feed, breed and weed," especially the latter. I don't think there is one dairyman that keeps a record of what his cows are doing, and, consequently, the profit and loss account is a very uncertain account.

FEEDING.—The great bane of feeding all sorts of cattle, yeld and milk cattle, is letting them run at large on roadsides and in the bush. Milch cows are very easily affected in their yield of milk by the distance they have to travel for their food. On the farm on which I was raised in Scotland, whenever the cows were sent to pasture in the farthest fields, it was known the same day in the less yield of milk. The only salvation for the dairying industry in this part is to grow soiling crops and erect silos. Farmers' Institutes and Agricultural Societies ought to encourage the growing of soiling crops and the making of ensilage, by offering good substantial prizes for the same, in order to draw the attention of the owners of cattle to this important subject.

Summer Feed for Dairy Cattle.—The only green crop which I think would fill the bill is corn; but this is one of the crying necessities for the immediate establishment of Experiment Stations. I think Experiment Stations, or an Experiment Union, should be one of the very first things in connection with agriculture to claim the attention of the Provincial Government.

Sheep.—Some of the Islands in the Gulf of Georgia are well adapted to raising sheep, Lasqueti Island especially, and Gabriola. Sheep-raising and dairying are almost on the same level, so far as profits are concerned. It may be said that sheep raisers need to feed, breed and weed, the same as in dairying. This is a country where large profits could be made out of sheep, if the same care and forethought were given to them as in Britain and Ontario.

Poultry.—In two or three places in the district poultry breeding has been carried on with system. R. J. Craig, Parksville, has made a profit of $2 a head. Mr. Miller, assistant nurse, Nanaimo Hospital, had lots of eggs all this winter, when others were doing nothing; and Mr. Smith, five-acre lots, made a daily profit of from $1.50 to $2 from 200 hens, all raised by the incubator this year, since the month of October. We ought to hear from these men how they do it. Eggs never sold for less than 25 cents a dozen. During November and December, 65 cents was the ruling price.

Bees.—Bee-keeping is being carried on more largely every year, especially in the neighbourhood of the New Vancouver Coal Company's Farm. One man made $250 out of 32 colonies. Honey fetched 25 cents a pound this year. White clover and Alsike during June and July.

Experiment Stations.—I think that the subject of Experiment Stations ought to be taken up immediately by the Government of British Columbia. If we wait until the Dominion Government gives this Province Experiment Stations, we will wait 20 years. The expenditure would be justified by the results, if thoroughly practical men took hold of the proposition.

Soils.—All of our soils need lime. All bottom lands are deficient in phosphoric acid and potash. Lime can be got at $1.50 a barrel; phosphoric acid for $25 a ton in Victoria; potash, in the form of muriate of potash, for $55 a ton; in form of kainit, $20. (Lime for agricultural purposes, $6 per ton.—J. R. A.)

Fertilizers.—Artificial manures are gradually coming into use. Nitrate of soda, $40 a ton; bone dust, $25 a ton; sulphate of potash, $60 a ton. Seaweed and dog salmon are used to some extent, but not nearly as much as they should. Before the use of artificial manures can be recommended, the most of the cleared land in this country needs thorough draining to get best results. (*See* "Soils and Fertilizers."—J.R.A.)

Clearing Land.—The best plan to remove large stumps is to blast them out with stumping powder and then set fire to them, or pull them out with a small stumping machine, or by the use of oxen. Stumping could be done very well by co-operation, but co-operation in that sort of work is an unknown quantity in these parts. The Sweep single-horse stumping machines, with ⅝-inch steel-wire rope, have operated the best of any that have come under my observation.

Draining.—Very little under-draining has been done in this district, except on the New Vancouver Coal Company's farm. The want is money at a reasonable rate of interest to do the draining thoroughly. Thorough under-draining is the first and great want; in fact, it is an absolute necessity to get the best results from the soil. Wet, sour land is a very fickle agent to cope with. Drain tile costs $1 a chain, and digging and filling in $1 a chain.

Pecuniary Assistance.—As stated under the head of draining, the only borrowed money that is safe for a farmer to handle is money borrowed for tile draining. In many cases it would pay to borrow money at 10 per cent. If the Government would follow the plan that was followed by the Government of Great Britain about 60 years ago, it would not go far wrong. There are many farms in Britain to this day that bear the marks of the immense improvement that draining brought with it when the Government loaned money for that purpose.

Weeds.—The only place where the Canada thistle has made its appearance in this district is at Northfield Crossing, on the E. & N. Railway. The thistles are allowed to go to seed.

Lands.—Esquimalt & Nanaimo Railway land is to be had in this district. All kinds are to be had, good, bad and indifferent, from Chemainus to Qualicum. The price of railway land is $5 an acre.

Labour.—Whites, very scarce, $20 to $35 a month, with board; Chinese, $8 to $15 a month, with board; Japanese, $8 to $22, without board. Chinese and Japanese labourers can usually be got, except during the fishing season.

Mr. Geo. Cassidy reports from Ladysmith much in the same terms as above.

The following is an excerpt from a letter to the "Colonist" newspaper by an anonymous writer, under date of 4th June, 1901:—

"The Island of Texada is situated in the Gulf of Georgia, near the 51st degree of latitude. The island is reached by steamer, or E. & N. Railway from Victoria to Nanaimo; thence up the gulf by steamer 49 miles to the Puget Sound Iron Mine wharf, from which the Government road bisects the island to the Marble Bay and Van Anda wharves, on the opposite shore. The island contains quite a nice sprinkling of alder lands and swamps and rolling hills and mountains, profuse with wild grass, remarkably adapted for sheep and cattle grazing. Some of the mountains rise up to 3,000 feet in height. The total length of the island is something over 30 miles, and the average width is estimated to be about 5 miles, making it the monarch of the gulf islands. The formations are granites, syenites, porphyrys, diorites, limestone and agglomerates, or amygdaloids. Copper is found in many of its varied varieties; native sulphides and glance iron in magnetite and oxide and numerous other forms; lead galenas, zincs, graphite, arsenical and antimonial ores, and, of most importance, free gold."

Comox,

Extending from the northern boundary of North Nanaimo to the northern boundary of Comox District, a distance of some 65 miles, and including the Islands of Hornby and Denman and the Districts of Castle, Nelson and Comox, is for the most part heavily wooded and sparsely populated, especially the two first named districts. Comox itself is one of the most beautiful and promising districts in the Province. In it are situated the Union Coal Mines, where a fine article of coal is produced, the majority of which is exported to California. These mines afford an excellent market for all the produce of the neighbouring agricultural sections. In the vicinity of the bay and extending back some distance, the country is fairly open, with a good many oaks scattered about. Further back and extending to Campbell River, a distance of some 30 miles, there is a large extent of level country, heavily timbered for the most part with fir, cedar, hemlock, spruce and maple, with some extensive swamps, which are capable of being easily drained, the land throughout being of excellent quality.

This is considered one of the best dairying districts in the Province. It is well watered throughout, and the land produces fine crops of clover, corn and other fodders suitable for milch cattle. A considerable quantity of butter is manufactured, and a co-operative creamery, now in the course of erection, will materially add to the output of dairy products. The means of communication are by waggon road and by steamer to Nanaimo. The projected extension of the Esquimalt and Nanaimo Railroad would, if constructed, pass through the entire district.

The timber consists principally of Douglas fir, cedar (a very fine quality), maple, alder and oak (*Quercus jacobi*). This is the most northerly limit of the oak, the southern limit being Sooke, and none being found on the Mainland.

The soil is fertile, but draining is most essential. In the swamps it is mostly black muck, with a bluish clay subsoil, and in other parts varying from a black or sandy loam in the bottoms to a red gravelly loam on the higher parts.

There are a number of good swamps in the district that can be cleared at little cost; they run in size from 20 to 100 acres. The soil is good, being composed largely of decomposed vegetation, and generally covered with a broad-leafed grass, which keeps green all winter and grows high. The cattle are very fond of it, and it keeps them in good condition. These swamps are easily ditched, and the timber, which is principally crab-apple and willow, is light.

Denman and Hornby are about 42 miles from Nanaimo, and lie close to Vancouver Island shore, the upper end of Denman being opposite the Union Mines, the latter place affording good market for produce.

Report of J. A. Halliday, correspondent, Comox:—

General Description.—There are three classes of soil—fir, alder and swamps. The soil is generally good, but the fir land is expensive to reclaim. The timber is good, but of no commercial value, except along the streams. It may cost from $30 to $200 an acre to prepare it for crop. Alder is easily cleared; stumps soon decay; soil friable and yields a good crop at the first. Cost of clearing, from $20 to $50 an acre. The swamps are old beaver-dams, where an outlet can be gotten at moderate expense. They are easily reclaimed, and yield great crops of grass from the first; as they get firmer they raise good grain and root crops. They vary in size from a few acres to 200 and 300 acres. Roads are generally good. Union Mines is our best local market.

Wheat.—Grain is produced entirely for home use; most of it is used for feeding stock. We can buy flour cheaper than we can make it, and can always sell the wheat for chicken feed.

Oats.—Lancaster and Black Tartarian are grown. Yield, one-half ton to one ton on the better farms. Price, 1¼ to 1⅜ cents per pound. Caterpillars and cut-worms did some damage.

Other grains grown in small quantities.

Peas almost entirely destroyed by cut-worms. Ruling price, 2 cents per pound.

Potatoes.—Cut-worm, caterpillar and rot all affected the potato crop. Price now (November 15th) is $35 a ton. The crop will not be over four tons to the acre. Beauty of Hebron, Burbank Seedling, Elephant and Rose are largely grown.

Grasses and Clovers.—Clover and Timothy are grown. We find them reliable and suitable for our kind of farming.

Indian Corn with us is a success, but only grown to be used in the kitchen.

Ensilage.—Ensilage corn will produce 70 tons to the acre. Had samples at the Agricultural Show 14 feet high, 4 to 6 ears on each stem.

Apples.—Orchards are small, no one kind in any quantity, but excellent apples are grown.

Other Fruits all succeed well and are grown in small quantities.

Dairying.—This is the chief industry of Comox. One farmer alone sold this season 17,000 pounds, from 22 to 33 cents per pound; 25 cents ruled. I estimate that 200 tons of butter would be within the mark for the season's output.

Feeding.—We have an excellent grass all summer, but bran, crushed oats and green corn are fed freely and profitably.

Horned Cattle.—Cows are worth $50 to $70 each. Beef sells freely at 7½ to 10 cents, dressed, by the carcass.

Sheep.—Perhaps 1,000 sheep in the valley. Lambs bring $5 to $6; ewes usually breed twins.

Swine.—The hog industry is carried on by all the dairymen. Say 800 are sold young, at 8 to 9 cents live weight.

Poultry.—Quite a number devote their whole time to this industry and do well. Minorcas, Barred Plymouth Rocks and Brown Leghorns are the favourites. Eggs vary from 25 to 60 cents per dozen.

Farmers' Institutes.—Have a very successful Institute. It owes much to Mr. J. R. Anderson for his untiring interest in it.

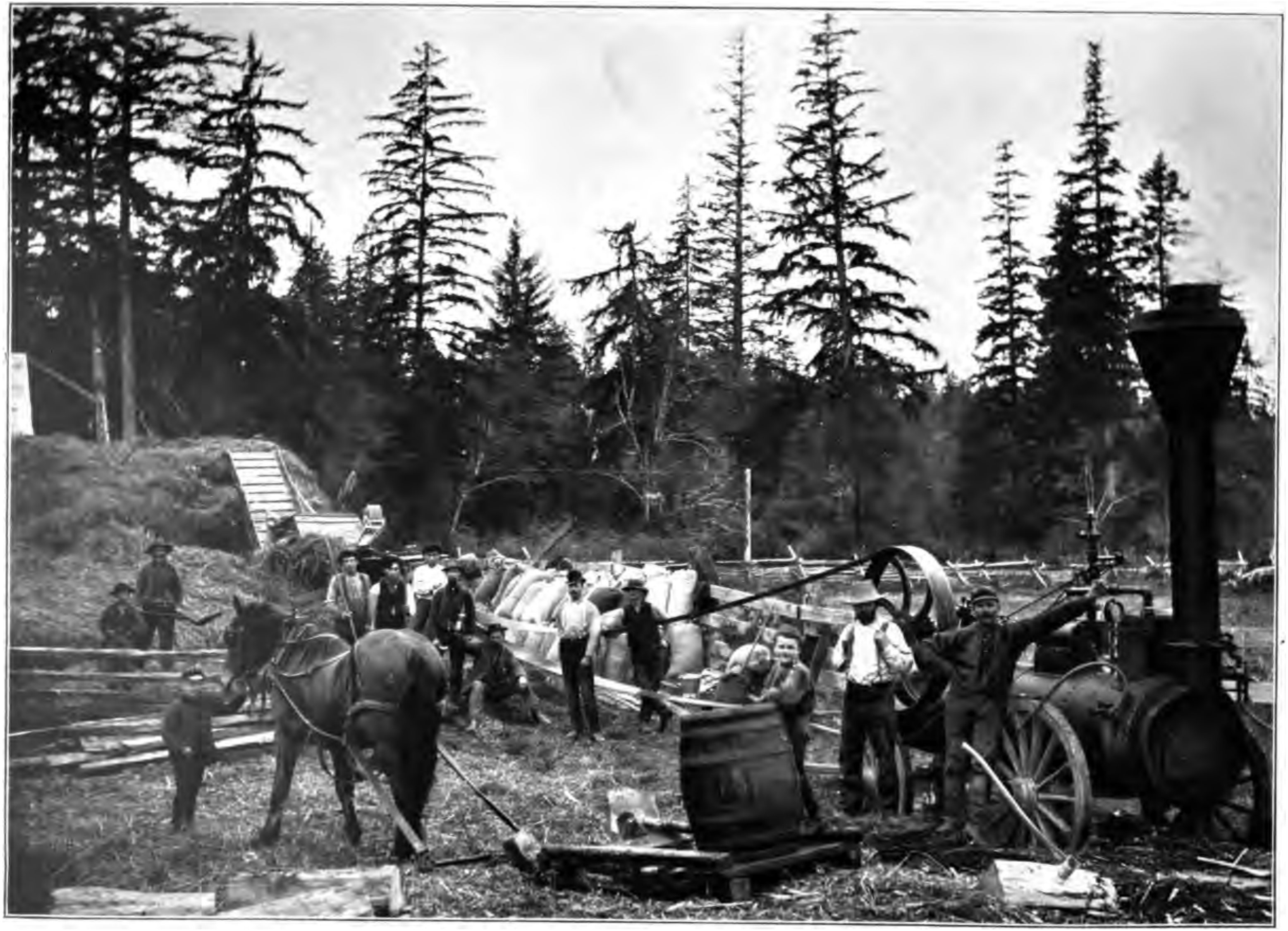
Ferlilizers.—Nitrate was tried last spring with marked success. Lime is lacking; no limestone in the valley.

Labour.—Whites, $25 per month, yearly engagements; Chinese, 50 cents to $1 per day, as occasion requires; some pay $15 per month; Japanese, $15 to $18 per month.

Mr. George Heatherbell, correspondent at Hornby Island, reports as follows:—

Wheat.—I may say, under this head, that some fall wheat grown here by Mr. John Skinner, and introduced by me about five years ago, received special mention at the Paris Exposition, 1900, after being shown at our (Comox) and the New Westminster show. It is called "Mammoth Italian," and I have grain that will not go through a quarter-inch riddle, and stood from ground to top 6 feet 2 inches high. All grown for feeding chickens and stock; cheaper to buy flour; no mill here to grind it. All wheat does fine with half a chance. No pests or frost to hurt it, as yet. Ruling prices during the year, ½ to 2 cents per pound.

Oats.—I have grown the New Zealand oats last two years, with very good results. The grain is small, but the yield is great. Oats are the main crop; they are used for feeding everything. No pests or diseases affecting oats. Price, 1½ cents.



THRESHING, COMOX.

BARLEY.—Does well indeed, but is objected to mainly on account of the awns being so troublesome and no proper machine to clean it right. I think it could be grown with profit for malt. If I had a crusher and power I should grow more for feed.

PEAS.—Largest crop grown next to oats; do fine with a reasonable show. No diseases or pests until 1900, when nearly all were destroyed by the pest of cut-worms. Price, 2 cents per pound.

POTATOES do well nearly always. Little trouble from disease or pests until 1900, when cut-worms destroyed lots. I tried Paris green; sprayed three times; increased the strength one-third each time from the regular formula of 4 ounces to 50 gallons, with 1 pound fresh lime, but did not do any good. I concluded the Paris green was no good. I think the department should see that there is plenty of Paris green of the right strength available, and make it criminal to sell adulterated stuff, as it causes no end of loss and annoyance.

OTHER ROOTS AND VEGETABLES all grown in varying quantities, but the cut-worm plague destroyed nearly the whole crop last year.

GRASSES AND CLOVERS.—The three clovers, Red, White and Alsike, all good. Timothy, Orchard and Red Top grass for hay, produce from 1½ to 2½ tons per acre. I am decidedly of opinion that Timothy is a poor grass for pasture, especially for sheep, and almost any grass is better (except Mesquite, which is little better than a weed), and I think it high time stock-raisers and dairymen tumbled to it. Some of the native grasses are very good.

CORN grows well, but does not ripen well on account, I think, of the cool nights. It would be all right for feed or ensilage, by getting the right kind.

RAPE.—I am beginning to think a great deal of this plant. It makes abundance of feed on good land. I have a fine piece now for sheep. It must be fed off the ground. There is everything in it that sheep require, including sulphur for the wool. Have been experimenting for three years, and will write you my experience about it later on. I may say I know nothing but good of it as yet.

APPLES are extensively raised here; a good crop for 1900. It was a little dry for the early kinds, but the late ones were a fine crop. There would be about 1,500 bearing trees and 400 young ones. The usual pests are the green aphis, oyster-shell bark louse, tent caterpillar, worms in the apple, and black spot on the bark. I am little troubled with any of them, thanks to the spray pump. I believe this Island will compare favourably with any place in the Province for raising fruit. Price, $1 a box.

PEARS do well, Bartletts at the head. I think pear leaf blight is the worst trouble. Price, $1.25 a box.

PLUMS AND PRUNES do fine here. Very heavy crops for 1900; rather a glut in the market. Price, about 50 cents for a box of 20 pounds. Prunes are better to sell, as they keep better, and there is more demand for them. If I plant more trees, it will be Bartlett pears and prunes.

CHERRIES do well, but the robins take most of them, and the crows are the worst pest we have here, and destroy more fruit than any other one thing.

BOARD OF HORTICULTURE.—I think the Board is doing good generally, and believe the inspection of trees and fruit (imported) is all right. I think it would be much better if the Inspector of Pests would get around and inspect the fruit and trees in the orchards, and advise the growers how best to do the right thing. I'm sure it would work up a better feeling between the Board and the ordinary fruit-grower, leaving out the experts who are supposed to know pretty much all about it already.

DAIRYING.—It is profitable enough with those who have the right method and make good butter. My prices have not been below 25 cents this season, and part of it 30 cents a pound.

SUMMER FEED FOR DAIRY CATTLE.—Oats and peas. Commence to cut when peas are in bloom and feed on until corn is ready, which is planted later, of course. I believe it pays the biggest kind, on the islands at least; and could plant Essex rape between rows at last cultivation of corn, and it would come in good for feeding sheep, after the corn was cut for feeding cows.

HORNED CATTLE.—This is a successful industry on this island. Beef has been from 7c. to 9c. this season. Shorthorns are preferred for beef.

SHEEP.—As compared with cattle, sheep are more profitable, where land is suitable. Shropshires are the farmers' sheep for the Coast and Islands, on account of their close fleeces, hardiness and good rustling qualities, etc. This island is suitable for the industry. Everyone has more or less sheep, and it is very profitable. Prices for mutton, from 4½c. to 6c. per pound, live weight, and about $6 each for breeding ewes. Wool is of no value, viz., 6c. The chief causes against profitable sheep-raising are want of knowledge and wet seasons.

HORSES.—Good, heavy horses bring a good price, and will continue to do so. Percheron, I think, is a good kind to raise.

SWINE-RAISING is not much prosecuted; enough for home use and a few to sell; kept to eat up surplus food. Prices have been 6c. to 8c., on foot. My place for the pig is in his pen.

POULTRY.—Properly cared for, poultry is the most remunerative thing on the farm. I recommend the Black Minorca every time, both for size and quantity of eggs, hardiness of birds, etc. Price for eggs has been from 20c. to 50c. per dozen at present time of writing this (Nov. 8th). I believe the reason why more hens are not kept is that we are apt to think there is more money in large things than small ones.

BEES.—This industry is not carried on, but I think every farmer and fruit-grower should keep bees, and would myself if I understood them. I think there are not enough bees and birds here.

AGRICULTURAL EDUCATION.—It would certainly do good to some of the pupils, but there would be quite a number that it would be of no use to, and in some cases they are already pretty well crammed with so many different subjects. At the same time, it may be of more use in the rural schools than some things now taught.

EXPERIMENTAL STATIONS.—I think the Dominion Government should establish an Experimental Station on Vancouver Island at some point.

CLEARING LAND.—My plan now is stumping powder, and a pair of heavy blocks (double and treble) to pull out the fangs and pieces not blown out. I have two pieces of wire rope, one for the anchor and one to put on the piece to be pulled, and with a pair of heavy horses and one man can do good work cheap. Most of the stumping machines are too cumbersome and unhandy to do good work cheaply; and then it is not so easy to get rid of the stumps when whole, as pulled by a machine, as when split to pieces by powder. It is almost impossible to give the cost of clearing land until one sees it, as there is such a vast amount of difference in the work to be done. But I would never think of taking out the stumps green, or until the timber had been cleared off at least two years, to allow the small roots to become rotten, and so loosen the soil easily.

DRAINING.—This very necessary work is not much done here, on account of the cost of it, not so much for labour as on account of not being able to get drain pipes reasonable. It is slow and costly work covering drains with cedar, which is the only good wood to put in a ditch, and you have to remove so much more dirt to get room for the wood than you would have to for pipe.

PECUNIARY ASSISTANCE.—I believe something could be done, such as is at present done in New Zealand, to assist the actual settler to clear up a portion of his claim without having to pay 8 or 10 per cent. for the loan of money required to do so, and which, I believe, keeps hundreds from settling on a piece of land, knowing full well that they could not stay with it long enough to get sufficient cleared to make a living, before their limited funds would be exhausted; and to borrow at 10 per cent. would perhaps mean to lose all.

WEEDS.—The Canada thistle is increasing here, I am sorry to say.

THE CUT-WORM did a great deal of damage here this season; destroyed everything for me except oats and wheat. All sorts of vegetables, turnips, mangolds, potatoes and peas are what they liked best.

LANDS.—Improved farms for sale at from $10 an acre up.

LABOUR.—Whites, $1 per day and board; Japanese, $10 to $15 per month. White labour is not always plentiful.

Northern part of Vancouver Island, and adjacent Islands,

Including Alert Bay, Fort Rupert, Cape Scott and Quatsino on the main island, being the only spots of any consequence where there are any white settlers, and the islands of Valdez, Thurlow, Read, Cortez, Hernando, Savory, Redonda, Hardwicke, Camp and Wyatt. There are many more islands which it is not necessary to mention specifically. This portion of the Province is very sparsely settled, and the means of communication being confined to steamers which are rather uncertain in their movements, the accession to its population has not and will not be much increased until better means of communication are established. A railway, now projected, connecting the two extremes of Vancouver Island, would no doubt be a great factor in settling up this portion.

Alert Bay, about 70 miles to the north-west of Valdez Island, is on the north-east coast of Vancouver Island. Some settlers have taken up land on the islands in the vicinity and in the valleys of streams. The country is generally wooded and well watered, and the soil is good. On Haddington Island a very fine quality of stone is found, of which the new Parliament Buildings at Victoria are constructed. Coal also exists at Port McNeil, and these, together with the salmon canning and the fishing industry, will, no doubt, form important factors in the development of this part of the country

Quatsino and Cape Scott include all the country in the northernmost part of Vancouver Island. A colony of Danish and Norwegian settlers have recently been established there, and it is hoped that with the assistance of other settlers the section will become a place of importance. The soil is described as productive, well watered, timbered with fir, cedar and hemlock. The climate is well suited to the production of all the usual cereals, vegetables and fruits. Although the fisheries are, so far, wholly undeveloped, enough is known regarding them to justify the belief that they are of immense value, and will form a valuable adjunct to the resources of that section, and contribute largely to the means of livelihood.

The following interesting report is from the pen of Mr. Henry Varney, correspondent at Quatsino:—

This is a small settlement at present, there being about fifteen or sixteen people occupying land here, but we have a population of about sixty souls, including children, and, as you are doubtless aware, composed chiefly of Scandinavians.

Although possessed of a fine, mild, equable climate, agriculture, I am sorry to state, has not made much progress amongst us, principally owing to the heavy timber characteristic of this coast. We have, generally speaking, a very fertile soil, and I have never seen finer crops of field and garden produce in England than have been raised here, where the clearing of the land and the tillage of the soil has been thoroughly and efficiently accomplished. Coming from a prairie country, almost destitute of timber, where the soil simply needed to be scratched on the surface and drawn up into hills to produce heavy crops, the majority of the ranchers here bitterly bemoan their lot, and do not appear to understand the necessity of grubbing the soil for a foot or more to get out the roots and boulders in order to raise a crop. Not only does this seem to me to be a *sine qua non* to successful cultivation, but manuring to some extent seems also necessary on some soils here. It may be that lime, in many instances, is the only element needful. There is limestone in abundance here, but no knowledge as to burning it. In others, potash is wanting, as proved by the marvellous effect a sowing of dry wood ashes has had. The writer's experience, however, has been that nothing equals the effect of an application of barn-yard manure, along with deep and thorough cultivation of the soil. Unfortunately, however, only one or two settlers possess even a cow, so that other means of fertilizing the soil have to be sought for. Now, seaweed can be obtained here in unlimited quantities, and as all the locations at present have been made on the salt water, this can be obtained quite easily. There are very few ranchers who have not a large bed of kelp outside their doors.

For a long time I have tried to convince the folks here what valuable resources they possess in the shape of this article for manurial purposes. If your Department could furnish any printed matter on the subject of manures and their application, I believe they would prove of valuable assistance. The writer has read that in the Channel Islands seaweed is the principal manure used.

There is, however, an immense area of land stretching from Marble Creek Valley to Alert Bay, on the east coast of the island, which does not appear to require the aid of manure, for potatoes have been grown to a prodigious size in this valley without the use of any manure whatever. I have seen some weighing 2¾ pounds each.

The land in question is at present not bought up, and is unoccupied, and would furnish farms for several hundred people. It is drained by Marble Creek, which is a large river, with a winding course of 40 or 50 miles in a north-westerly direction, and draining several large lakes. The land, I believe, will be settled upon in the near future.

Last winter the climbing roses on the house walls remained all winter luxuriant in foliage.

Mr. Nicholas Thompson, correspondent, Cortez Island, reports as follows:—

GENERAL DESCRIPTION.—There are about 16 settlers living on their places on this island at present. Each rancher has about 10 acres cleared; there may be one or two who have a little more than that, but 10 is about the average. The land is heavy clearing. Our nearest market is Vancouver, a distance of 100 miles. The steamer calls twice a week. We have very poor roads. The climate up here is good, and there are plenty of deer, grouse and fish to be had for the hunting of them. I may say the principal crops are potatoes and roots, which do well. The great drawback here is the land is so rocky—more rock than good land. The timber on the island is principally fir and cedar. There is no school, there not being enough children. All roots and vegetables suffered severely from the inroads of cut-worms last year. Varieties of potatoes recommended are Early Rose, Burbank Seedling, Ashcroft and Magnum Bonum.

TIMOTHY and Red and White clovers are the principal grasses grown here.

APPLES do well. There are three or four orchards set out; altogether, there must be some 500 trees out. The apple that does best here is the Yellow Transparent, which can be plucked for market in July; they are a good-sized apple. Red Astrachans do well, but I find they don't pay, as the time they are ripe the market is generally stocked. Duchess of Oldenberg, Russets and Northern Spy also do very well.

PEARS.—The Bartlett I find is the most profitable.

OTHER FRUITS also succeed well.

SWINE.—There are not many pigs raised here, but there is always a good price to be got. Live weight, from 5 to 6 cents a pound; dressed, from 7½ to 8 cents.

POULTRY.—I am going into this line of business myself at present. I have about 150 hens, and intend to keep increasing. So far I have done very well. At present eggs are worth from 20 to 25 cents a dozen, and chickens for table use $6 a dozen.

ENTOMOLOGICAL.—We had the cut-worms very bad here last year, one or two losing what little crop they had in. Onions, potatoes, turnips, mangolds, cabbage and beet-root were most affected. Parsnips they did not touch at all. Along in July they were most plentiful. Paris green was the best remedy tried here.

Mr. S. A. Spencer, correspondent, Alert Bay, makes the following report of that section:—

GENERAL DESCRIPTION.—The country is generally mountainous and unfit for agriculture. In a few isolated places, small patches of land, when cleared, might be productive. The country is more likely to be productive of mineral. No roads; all communication is by water. There is a public school for white children at Alert Bay. Game, fairly plentiful, consists of deer, elk, grouse and bear. There are salmon and trout in nearly all the rivers and streams. White population, about 60.

ROOTS AND VEGETABLES are produced for home use and feeding only.

LARGE FRUITS have not proved to be a success, so far.

SMALL FRUITS give splendid yields.

LIVE STOCK.—What few cattle and sheep are used here pay well, as there is very little winter feeding required.

DYKING.—At the heads of several of the inlets there are some hundreds of acres of land that would make good ranches if dyked. A little dyking has been done at the head of Kingcome Inlet, but not enough to be a guide as to cost.

ENTOMOLOGICAL.—The cut-worm is the only pest that seems to have caused any trouble.

PANTHERS AND WOLVES.—Bounty fair for panthers, but too little for wolves. The wolves have increased a little, and the bounty should be paid for them, no matter where they are killed.

FOREST FIRES are almost invariably caused by carelessness, campers leaving fires unextinguished.

LABOUR.—Whites, $2 to $2.50 per day; Indians, $1.50 per day. Supply equals demand. Indians preponderate.

N. T. Neilsen, correspondent, Cape Scott, reports as follows:—

GENERAL DESCRIPTION.—Cape Scott forms the north end of Vancouver Island. Three large rivers and creeks are running through the district, along which there is more or less alluvial soil, which will make splendid homes to many industrious settlers. The higher lands

WHEAT FIELD, SAANICH.

consist principally of *sallal soil, and are about from 100 to 200 feet above the level of the sea. There are a good many hills from 300 to about 2,000 feet above sea level. Some land is only very lightly timbered. The principal market for produce is Victoria, 300 miles distant, and is reached by steamboat. There is no harbour, but a couple of very good landings. A trail from here to Quatsino, West Arm, is completed half-way, and will be entirely completed next year. There are no mines in operation, but coal, copper and gold have been found. A railway company, named the Comox and Cape Scott Railway Company, is incorporated. There is a public school, open all the year round. Sportsmen will find an abundance of game and fish, trout, salmon, cod, flounders and halibut in the water; swans, geese and ducks. Grouse, deer, elks, and larger game, such as wolves and bears, may also be found. The climate is very healthy; yearly rainfall about 100 inches; highest and lowest temperature 84° and 15° above zero. Population is about 70 people, but a large immigration to this district is expected next year. (*Gantheria shallon.—J. R. A.)

OATS have been tried in several spots; some places they did well, and on others they did not mature, the reason for which doubtless is that the ground was just cleared and only partly cultivated and drained

BARLEY.—No barley has been grown before, but about one acre is seeded down now and promises well.

POTATOES do well in some soils, not in others ; the latter were not cultivated enough.

HAY AND GRASSES.—Timothy, Red Top, Orchard grass, Red and Alsike clover are grown here, and where the land is well drained and has been cultivated a couple of years it makes a splendid growth. Timothy is growing up to six feet in height, Orchard grass five, and Red clover three feet high. There are some native grasses here, one of which resembles Orchard grass. It does well in a wild state, but a lot of seed harvested and sown on cleared land did not germinate.

DAIRYING.—The climate makes this country one of the best dairying countries in the world. The almost entire absence of snow and frost, and the moist, warm summers, pronounce this country to be one of the foremost in dairying.

SOILS.—The soil on the north end of Vancouver Island is of a peculiar kind, and if there is much of the same kind in this Province the expenditure would doubtless be justified, as it seems very difficult to make anything grow unless the soil is well manured. It consists principally of that known as sallal soil, and seems to be lacking in some constituents, as it is not willing to grow anything right away unless barnyard manure is put on, the river bottoms excepted. Nitrate of soda has been tried; it costs about $3 per 100 pounds here. Lime has been tried with apparently good results; price at the landing about $12 per ton. No care has so far been bestowed on barn-yard manure, sea-weed or ashes, but considerable care will be taken of the barn-yard manure in future, so as to make as much as possible and keep it under cover.

CLEARING LAND.—Only two ways of clearing land have been tried here; one is the old way, with axe and grub-hoe; the other, with a stump-puller. I am in possession of a Smith stump-pulling machine, and consider it a very handy implement. So far, I have used it nearly entirely with my own labour, having no team; but I am satisfied that with a team it is no trick to pull up stumps that are 3 to 4 feet in diameter, as I can pull them by hand after cutting one or two roots. It is very hard work, however; but if the cable is fastened to the trunk about 10 or 15 feet up, trees come down quite easily.

CUT-WORMS did all the damage last year that could be done; they destroyed everything, in fact, no remedy being at hand. The worms appeared in July.

DRAINING.—We only use the common way of draining, putting down the drains from 2 to 4 feet. The cost of drain pipes is not known, but there is any amount of cedar, which may be had for the cutting.

DYKING.—There are about 1,000 acres which might be reclaimed by dyking. It is principally peaty, but near the rivers there is some alluvial deposit. A dyke is being built now and is half done. The water has been shut out. The dyke is 6 feet high, 19 feet thick at the bottom, built of dirt with grass sods on the outside; cost in labour, about $7 per rod. A dyke reclaiming 900 acres may be built at a cost of $5,000, according to a surveyor's estimate.

TIMBER.—There is not much valuable timber here, except along the larger rivers and creeks. The following kinds of trees grow here: hemlock, red and yellow cedar, balsam, fir, alder, bull pine, yew, and some fine spruce on river bottom.

LANDS.—There are thousands of acres of Government lands open for pre-emption in this district. The soil consists partly of what is commonly known as sallal soil, and partly of alluvial soils along the rivers and larger creeks. There is still some very good river bottom to be had, but as soon as the Comox & Cape Scott Railway is under way it will doubtless go quick, as a good many intending settlers send inquiring letters up here.

West Coast of Vancouver Island,

Including Alberni, Clayoquot, Ucluelet and Port Renfrew. Messrs. Duncan C. Anderson and Andrew Elliott, of Ontario, speakers at meetings of Farmers' Institutes, who attended and addressed the farmers at the spring meetings, were highly impressed with the possibilities of Alberni, and expressed their belief that in the near future it would be one of the leading agricultural districts.

METEOROLOGICAL RECORDS FOR 1900.

At Carmanah:—

Highest temperature (incomplete), July	70.0°
Lowest " " February	18.0°
Rainfall	112.86 inches.
Snowfall	10. "

At Alberni:—

Highest temperature, July	91.2°
Lowest " February	12.9°
Rainfall	80.54 inches.
Snowfall	21.8 "

At Clayoquot:—

Highest temperature, July	78.0°
Rest incomplete.	

The following is compiled from the reports of F. H. Avery and Stanley R. S. Bayne, correspondents, Alberni:—

GENERAL DESCRIPTION.—The Alberni Valley is about 20 miles long and 4 miles wide, and is divided into three districts, viz.: Sproat Lake to the west, Beaver Creek to the north, and Cherry Creek to the east. Of these, Beaver Creek has the most settlers. In this direction the valley extends for 12 or 14 miles, and there is much unoccupied land which, with co-operative drainage, ought to be very valuable in time to come. In the other districts, too, there is good land lying vacant. The soil is for the most part a clayey loam and very productive. Market mostly local, the freight rates being too high for competition outside. Three mines are being operated in the district, viz.: Golden Eagle on China Creek, and the Hayes Mine and Monitor on the Alberni Canal, though very little ore has, so far, been shipped. Roads good. Communication twice weekly with Nanaimo by stage, and three times monthly by steamer with Victoria and the northern part of the island. Three schools. Game is plentiful, as also trout and salmon in season. Population, about 300. It is well watered, having several large and small lakes, besides rivers and creeks.

OATS are produced for feed principally. Giant Cluster and Rennie's Prize are amongst the favourites. Average yield, 30 bushels per acre. Prices ranged from 1c. to 1¾c. per pound.

OTHER GRAINS and peas are not grown to any extent, there being no inducement for their production.

POTATOES.—Varieties chiefly grown are Early Rose and Burbank Seedling. Cut-worms cleared out some patches completely, while others were not touched. Yield, about five tons per acre. Prices, $1 to $1.25 per 100 pounds.

OTHER ROOTS AND VEGETABLES are successfully produced, but are not extensively grown; chiefly for feeding animals. Ruling prices were: carrots, ½c. to 1c. per pound; turnips, $10 to $15 per ton; onions, 2c. to 3c. per pound; cabbages, 2c., and others about 1c. per pound.

GRASSES AND CLOVERS.—Timothy, Orchard, Red Clover, Alsike. Yield, from 1½ to 2 tons per acre; price, $10 to $15 per ton. Timothy can generally be cured well. Orchard grass and clover ripen a little too early, and are very hard to cure properly, owing to wet weather. They have a good second growth, however, which is lacking in Timothy, unless cut very early and on very wet land. Timothy is a good general-purpose grass, but for dairy purposes peas and oats, mixed, are much preferred.

Indian Corn grows well here, but ripens or gets glazed a little too late. I have grown Thoroughbred White Flint, but have had to cut it before maturity.

Ensilage.—The late Mr. Faber grew ensilage and made a great success of it. I have tried it, but with no success; generally second crop of clover and corn; had no cutter.

Apples.—Astrachan, Transparent, Duchess, Wealthy, Mann, Baldwin, Ribston Pippin and King are grown. Yield indifferent last year; prices range from 1c. to 3c. per pound.

Pears.—Flemish Beauty, Bartlett and Winter Nelis are grown. Good yield; prices range from 1c. to 3c. per pound.

Plums and Prunes.—Lombard, Greengage, Yellow Egg, Victoria, Golden Drop plums, and Golden, Italian and German prunes are grown, and yielded heavily.

Other Fruits produce well, and are cultivated to a limited extent.

Dairying is carried on by quite a number on a small scale, and is fairly remunerative. No experience with co-operative creameries.

Feeding.—To buy feed is out of the question, as that means cash out and no way of getting any in; therefore, it is unprofitable. If grown, it pays well; but it has to be ground, otherwise a very large percentage passes through the animals, especially peas in pigs.

Summer Feed for Dairy Cattle.—Second clover crops answer well here, or oats and peas sown late.

Horned Cattle.—This is a successful industry. Beef is worth from 7 to 9 cents per pound, dressed; milch cows, according to breed, $30 to $60. For beef, Shorthorns are preferred; for milk, a cross between Jersey or Guernsey bulls and Shorthorn cows.

Sheep.—This district is too wet on the low lands for sheep; they, however, do well on the high land and ridges. Few sheep are kept, so far, though it is a profitable industry. Lambs bring about $4.50, and sheep from $5.50 to $6; wool is worthless. The principal drawbacks are panthers, liver fluke and wet.

Swine.—Not many pigs raised in this district; home market easily supplied. Ruling price, from 8 to 10 cents per pound, dressed. Berkshires are the most profitable. I think the white breeds grow faster when comparing the two side by side. I consider it a waste of feed and laziness on the owner's part to allow swine to feed down grain.

Poultry.—Some few have gone into poultry of late, as our market has been good this year for the first time. I consider it pays well. Prices rule from 20 to 40 cents per dozen for eggs. Leghorns and Plymouth Rocks are the favourites.

Bees.—Very few bees kept so far, but increasing gradually. Italian bees are the most suitable. Price of honey, 25 cents per pound; yield, 30 to 40 pounds per hive. Honey-producing plants, Red clover, chiefly. We have the clover in blossom during June and September; the peach in blossom in March, as well as a few wild flowers; after that, any amount of blossom until September.

Experimental Stations are very good, but have them smaller and more scattered over the Province, with a little less grain testing. The best experiment I have yet seen was Prof. Robertson's 30 cows on 40 acres; something we can copy and try to beat.

Farmers' Institutes.—Farmers' Institutes are good, if only as debating clubs. They give one ideas to think about, and there is always something one can learn. They should be held in the afternoons, and not in the evenings, as most of the farmers have a long way to travel and have plenty of chores at the end, unless their poor wives have done it all.

Soil.—A red clay loam chiefly, with ridges of glacial clay on the mountains; the hollows, black clay loam, with white, yellow and blue clay subsoil; also beaver meadows.

Fertilizers.—Barnyard manure is the chief fertilizer here; a few gardeners use artificial, with very good results. The soil here wants chiefly humus, and barnyard manure will supply it better than artificial manures.

Clearing Land.—Blow them out with stumping powder, by making a hole under the centre of the stump. Stumping machines leave too much dirt to be cleaned off the roots after extraction. Pulling down trees after being killed is too slow, as each tree pulled down will have to be sawn up and logged at once, before the stumper will be able to pull down another tree, so letting it lie idle, which is too expensive at $5 per day. Cost of clearing land here, from $25 to $50 per acre, that is, leaving the stumps in the ground.

DRAINING.—A little under-draining done in low places pays well for the trouble. Drain pipes are too expensive; cedar is used where plentiful, and fir where cedar cannot be obtained.

DYKING.—The Alberni Flats, owned by Anderson & Co., require dyking; they are alluvial deposit for the most part, with gravelly subsoil.

TIMBER.—Douglas fir (*Pseudotsuga douglasii*), spruce, hemlock, maple, dogwood (*Cornus*), bearwood, crabapple, balsam, arbutus (very scarce), white pine (*Pinus monticola*), cottonwood, alder, cedar, yellow cedar (top of mountain), yew. Douglas fir is the chief timber to the mountain top; cedar, in patches and generally swampy lands; spruce, in patches and low, gravelly lands; alder, chiefly in the bottoms on clay; dogwood, scattered on high lands; and the same with maple.

ENTOMOLOGICAL.—Cut-worms were very destructive this season in this district. The root crops received most damage, though the fruits, especially apples, were affected in parts. They destroyed all my tomatoes and cabbages in a glance. At the settlements, potatoes, carrots, turnips and cabbages were destroyed. My neighbour had a field of timothy heads all eaten, and they were commencing on his oats.

LANDS.—Government land for pre-emption on Alberni Canal, Taylor Arm and Road, and Sproat's and Great Central Lakes. Lots of railway land waiting to be settled on, good, bad and indifferent. The valley is not a quarter taken up. The land varies from cedar swamps and alder bottoms to ridge land. The quantity, location and prices can be seen on the E. & N. Railway's maps of Alberni District. Price, $3 per acre, with 6 per cent. interest on deferred payments. About 30,000 acres of vacant land located between Alberni and Comox. From $500 to $6,000 for improved farms.

LABOUR.—Whites, $2.50 per day; Chinese, few, $1.50 per day. This year white labour has been scarce, owing to new roads being built.

Mr. John Chesterman, correspondent, Clayoquot, sends the following report:—

Clayoquot is situated on the west coast of Vancouver Island, about 140 miles from Victoria. Its natural resources consist of mining, fishing and timber. Although a large quantity of mineral is found in this district, the claims are not enough developed to be shipping ore.

Fishing is carried on to some extent by the C. F. & T. Co., who own the cannery situated at the mouth of Kennedy River, which put up about 7,000 cases annually. There is a large amount of halibut in the adjacent waters which have not yet been utilised.

Timber is used to a small extent by Anseth & Wingen at their saw-mill. The outlook is that logging will be carried on to a large extent this coming season by James Sutton, of Ucluelet, who owns large timber interests in this district.

There are at present three stores and three hotels, with another store under construction. There are two missions established here for the benefit of the Indians.

The number of people engaged in agriculture in this district is about 100. As it is a recently settled district, there are only about 200 acres under cultivation and in meadow.

Wheat has not been tried. I think it more profitable to buy flour in this district and to use such grain as would be raised here for feeding purposes.

Oats and barley have been tried, but cut for hay before maturity, giving an average yield.

Peas, beans, potatoes, mangolds, carrots, turnips, onions, beets, parsnips and cabbages are all raised with success, although troubled, to some extent, by cut-worms during the season of 1900.

Grasses and clovers do well. The experience of this district in regard to native grasses is that the grass grown on salt marshes is favourable for hay and also grazing purposes.

Corn, as far as tried, has been very favourable.

Although quite a number of apple trees have been planted, they are not far enough advanced yet to judge of a result, but the indications are favourable. The same can be said of pears, plums and cherries. Small fruits are successful.

This district is naturally adapted for dairying purposes. The climate is all that can be desired, as the winters are exceedingly mild and open, there being scarcely any snow or frost.

Cattle raising is a success in this district. The favorite breeds are Holstein, Ayrshire and Durham.

It seems to be the opinion of this district that a course of agricultural education should be taught in the schools of this district.

My opinion is that the land should be slashed during April and May, and burned in the late summer; then logged and burned in the fall and early winter, and the stumps be allowed

HAYING, SALT SPRING ISLAND.

to stand three or four years and removed with powder. Where stumps are low in the ground and there is a solid subsoil, the charge of powder should be placed directly under the centre of the stump, close up to the stump, in order to split it into pieces, so they can then be easily removed with a team, as stumps handled in this way are easier disposed of than if removed whole. Cutting the roots and pulling down the trees has been successfully tried in this district. Most land in this district will need to be under-drained, and as there is an abundance of cedar, it seems more favourable to use it than buy tiles.

There are thousands of acres of tide lands that could be reclaimed by dyking. The subsoil is clay. What dyking has been done demonstrates the fact that it can be carried on to a success.

The principal timbers in this district are cedar, spruce, balsam and hemlock, with some fir, crab-apple, alder, yew, white pine, yellow cedar and soft maple.

The principal underbrush is sallal, salmonberry and huckleberry.

There are quite a number of panthers in this district.

There is plenty of surveyed agricultural land open for pre-emption in this district.

From Port Renfrew Mr. C. Blackstaff, the correspondent, sends the following report:—

General Description.—This district is commonly known as San Juan Valley. We have very rich alluvial soil, on which can be raised large quantities of hay. Then we have land suitable for fruit-growing. The valley is very healthy. There is plenty of game and fish. We have no schools. Our market is Victoria, and we have a weekly steamer. Our main river is blocked by a large log-jam at present, and our roads and trails are very bad, but we hope it is the intention of the Government to put us in good roads at an early date.

Timber.—I cannot give you the botanical names, but what they are commonly known by. The valley and mountains are densely wooded, and very large quantities can be easily got to the harbour. We have spruce, Douglas fir, balsam fir, hemlock, soft maple, vine maple, red and yellow cedar and yew.

Entomological.—Cut-worms appeared here at the beginning of July. Crops affected were cabbage, turnips, onions and potatoes. These were sprayed with Paris green, which prevented their entire destruction. We do not molest or destroy robins, but do our best to encourage them to remain; and we can see they do us an immense deal of good.

Forest Fires.—If a man wants to farm he must have the help of fire, and he must burn his fallow in July or August up here; but we have not found fire to run in hemlock, though in spruce it is very destructive. To destroy such fine timber as we have up here for farming is not only a waste but a sin; but how to get it taken off *soon* is a question. It will be taken some day, but surely the pioneers are entitled to some *present* benefits, as we do all we can to preserve the timber.

The Islands,

In which are included Salt Spring, Galiano, Mayne, Pender, Saturna, Moresby, Sidney, Prevost, and all the smaller islands lying between the southern end of Vancouver Island and the Mainland. The climate of these islands is equable in the extreme, and, consequently, well adapted for fruit culture, which industry is carried on to a considerable extent and with great success. On account, also, of their immunity from predatory animals, the raising of sheep is most successfully prosecuted.

Mr. Theo. Trage, correspondent, Beaver Point, Salt Spring Island, sends the following report:—

General Description.—There is no more land to be pre-empted; every acre has been taken up some time ago. About one-fourth of the soil is real good land; the balance rocks. For markets we have Victoria and Nanaimo; we are connected four times per week with Victoria and twice with Nanaimo by steamer. There are no mines; one school.

Cereals are not cultivated to any extent, oats excepted, of which some are produced for feed. Peas are also grown in fair quantities.

Potatoes.—Early and Late Rose, Burbank Seedling, Green Mountain and several other late varieties are grown and produce about four tons per acre. Considerable trouble with cut-worm. Ruling price, $18 per ton.

Other Roots and Vegetables are not produced in any quantity.

Grasses and Clovers.—Timothy, Rye grass and Red clover are produced; about two tons per acre for hay; none grown for sale. Red or White clover I consider better than Timothy.

Indian Corn.—There is very little cultivated here, only a few acres to be cut green for milking cows.

Apples.—Duchess, Gravenstein, Bietingheimer, Wealthy, King, Wolf River, Canada Reinette, Baldwin, Gloria Mundi and Fallawater are grown. Good yield; weather all right; very little disease. Price, about 2c. per pound.

All the other large fruits do exceedingly well, but are not produced to any extent, there being more profit in apples.

Strawberries are the only small fruit grown for market; price, 7c. per pound.

Dairying only carried on by private dairies; pays well.

Sheep.—Part of the district is suitable enough. Southdowns, Shropshire Down and Cotswold are kept. Good prices were paid for lambs, about $4 each; mutton has been 4½c. per pound. Pays well enough.

Poultry.—This industry is systematically prosecuted, and is remunerative. The best breeds are Brown Leghorn, Plymouth Rock and Black Minorcas. Price, $5 per dozen; eggs, from 20c. to 40c. per dozen.

Agricultural Education.—I do not think it would do any good, unless the teacher was a practical farmer.

Draining is carried on to a large extent. Only drain-pipes or cedar used here.

Timber trees are Douglas fir, cedar, balsam, hemlock, maple, alder, spruce, willow, poplar and dogwood.

Entomological.—The cut-worm was the only pest; no trouble last season.

Labour.—Whites, $1.50 per day; Japanese, 50c. per day. Plenty of Japanese here, but white labour is scarce.

Mr. R. A. R. Purdy, correspondent, Vesuvius, reports as follows:—

Grasses and Clover.—Timothy is good on bottom and does well on peat.

Apples.—Most of the standard varieties are produced to perfection and fetch good prices.

Other Fruits are successfully cultivated, but not produced in large quantities.

Board of Horticulture.—For honest growers we consider that a rigid enforcement of the rule compelling the boxes to be branded by the grower should be enforced.

Dairying is carried on to a considerable extent by private people, and is profitable. The tendency is for each to have a separator and make his own butter. Few send their milk to the creamery.

Summer Feed for Dairy Cattle.—Sadly neglected; green corn and tares should be used, but they are not.

Sheep.—This district is suitable for sheep raising. It is carried on to a considerable extent, and is profitable. Shropshires are recommended. Ruling prices were: $4.50 for early lambs; 6c. per pound for sheep, and 6c. per pound for wool.

Poultry Raising is beginning to be taken up with system, and is remunerative. Houdans are recommended for eggs and hardiness, and Wyandottes for table and general purpose. Neglect of proper attention is the cause of failure, and raccoons, minks, hawks and crows are the enemies.

Agricultural Education.—Much of the bad farming is owing to the lack of knowledge of farming. It should be taught in the public schools.

Clearing Land.—If the Government would buy large quantities of powder and sell it at reduced cost to the farmer, it would do more good for the farmers than all the lectures or experiments together, because we must first clear the land before we can experiment with it or grow anything. The most successful way is to blow out the stumps with powder. It costs about $100 per acre to clear the high lands; the low lands can be cleared for less.

Report of Washington Grimmer, correspondent, Pender Island:—

General Description.—North Pender Island is that portion lying north of Browning Harbour on the east side and Boat Harbour on the west side, which is the side that most of the shipping from the Mainland and east coast of Vancouver Island passes. The land is divided up into separate valleys, varying from 20 acres up to over 300 acres in extent. The soil is really good in most of the valleys, and comparatively easy to clear; but high up on the side-hills the timber is larger, the soil rather rocky, and on the summits almost solid rock, but timbered more or less, and some wild grasses and clover. Government wharves, school, Presbyterian service weekly, very pretty scenery and beaches, snug harbours, plenty of fish, deer, grouse, pheasants and Bob White quail; mostly Old Country settlers, industrious and thrifty, with pretty, attractive homes. Population of North Pender, about 60. Markets, chiefly Victoria, but Nanaimo, Vancouver and New Westminster about equal distance away, this place being about the centre of the coast markets. Mixed farming is carried on successfully, but lamb raising is remunerative and the chief branch of agriculture here.

CEREALS are not grown on these islands, as land can be put to more profitable uses. The same may be said of peas, beans, etc.

POTATOES yield about six tons to the acre; quality good; ruling price, $20 per ton.

OTHER ROOTS AND VEGETABLES, except onions, are produced principally for local consumption and feeding stock. Crop this year much reduced, owing to ravages of cut-worms. Onions are produced in considerable quantities and yield well; ruling price, 2 cents per pound; variety, Yellow Danvers.

GRASSES AND CLOVERS.—Orchard grass, Red Top, Kentucky Blue grass, Rye grass and Timothy. Clovers—Red, Alsike and White Dutch. Yield, about 2 tons per acre. All fed on the farms to the stock. Nearly all hay and pasture land seeding down with the above mixture, which acts very well for stock feed on the farms, but a little more of the clovers and less Timothy would be better for sheep and cows, as horses are a secondary consideration with most of us here.

NATIVE GRASSES.—Not much attention paid to native grasses here yet, but a small clover which grows on the rocks is a little help to stock in the spring, though a better one is a wild blue clover that grows on moist, good land and is excellent for hay and pasture, while it lasts in the spring; never tried it under cultivation yet.

INDIAN CORN ripens most years, but we do not know much about the best varieties to grow for the climate of British Columbia.

RAPE.—A little for sheep; does well and should be grown more extensively.

VETCHES.—There are two or three wild varieties which flourish well here, especially the large, coarse kind.

APPLES.—Most of the leading varieties do well, such as King, Greening, Baldwin, Red Astrachan, Wealthy, Gravenstein, Yellow Bellefleur, etc. The yield was very good. Apples average very well here, one year with another. Diseases and pests are green aphis and spotted apples. Last year a little dry rot appeared. Price for apples, 75 cents to $1 per box, in the fall.

PEARS.—Winter pears of several varieties are grown; Bartlett, Louise Bonne de Jersey and several other varieties that do well. Pears seem well suited to this island, owing to the clay subsoil underneath the best land. Ruling price, 75 cents to $1 per box.

PLUMS AND PRUNES.—Greengage, Yellow Egg, Pond's Seedling, etc. Prunes—German, French and Coe's Golden Drop do well. Price, about 3 cents per pound.

All the other ordinary fruits are most successfully grown, but are not produced to any extent.

BOARD OF HORTICULTURE.—Should strictly enforce the rule against the sale of infected or poor fruit, whether it be foreign or home-grown.

DAIRYING is carried on in a limited way at present; rather profitable, but too much work unless one has cheap help.

FEEDING.—Not much experience, except with sheep, and they are almost a failure, owing to a rough, careless way of running them in the woods on what they can pick up; but under fence and in good pastures of mixed grasses and clovers they are fairly profitable, when the price of lambs and mutton is good, but not otherwise, as pastures, even in the rough, are expensive to make.

SUMMER FEED FOR DAIRY CATTLE.—We are not much troubled with dried up pastures, as our valleys and farms have mostly the cool side, while the pastures keep pretty succulent, but think fodder corn and a second crop of Red clover would be a great help in August and September.

HORNED CATTLE.—Not attempted yet, but think if wool does not get higher than from 5 to 7 cents per pound, cattle raising would pay, perhaps better than sheep, if worked systematically. Shorthorn or Devon would do well here, and steers sold in spring not over two years old.

SHEEP very suitable, and industry carried on successfully wherever tried carefully. Breeds recommended, Shropshires or Oxford Downs, or any of the black-faced breeds. Price for 1900, 4½ to 5 cents per pound for mutton; lambs, $4.50 to $3.50. No wild animals here, and bad dogs very rarely, as nearly every farmer keeps sheep. The want of a woollen mill in British Columbia, which would make a price for wool, is the chief drawback to the industry.

HOGS.—Swine breeding is becoming more and more important here, as it is profitable if carried on systematically. Ruling price, 5½ to 7 cents per pound, live weight. Think pasture and milk in summer, with a little meal and peas and mangolds in fall, for fattening, would be economical feeding.

POULTRY.—In a limited manner at present, but see no reason for it not being engaged in extensively, especially around here. The reason it is not followed up better is, I think, labour (white) is too dear, and one or two pair of hands cannot do everything at once. More small farmers in British Columbia might remedy the enormous importation of eggs and poultry complained of, that is, if they were farmers of the right sort; but don't expect too much of the present lot of farmers; their hands can only accomplish one thing well at a time.

BEES.—None tried yet. Some think wasps would be hard on them; also swarming in our tall trees would be a great difficulty to the industry.

AGRICULTURAL EDUCATION.—I think agricultural education should be taught in our public schools, anyhow in rural schools; and I don't think any harm would happen if rural school masters spent one-half day in the week, in the growing season, gardening with the pupils, say on the school-grounds, if fertile and cleared. If not, let them go to work and make it somewhat better. I think they would likely enjoy it, and it would be an object-lesson for the children.

SOIL.—Perhaps a little deficient in lime; otherwise it is very productive, if well drained and worked properly.

CLEARING LAND.—Powder, and stump-pullers afterwards, are generally considered best for removing stumps. To clear the most easily cleared land here will cost about $50 per acre, and the heaviest over $100 per acre. The latter is best adapted for fruit trees.

FERTILIZERS.—Only barn-yard manure used at present. Seaweed could be got easily in places, but is not used yet.

DRAINING.—Considerable under-draining is done here, mostly with cedar, which is plentiful.

PECUNIARY ASSISTANCE.—Don't think pecuniary assistance very practical in British Columbia, as it is not a systematic farming country, although a bountiful country to the industrious and careful worker.

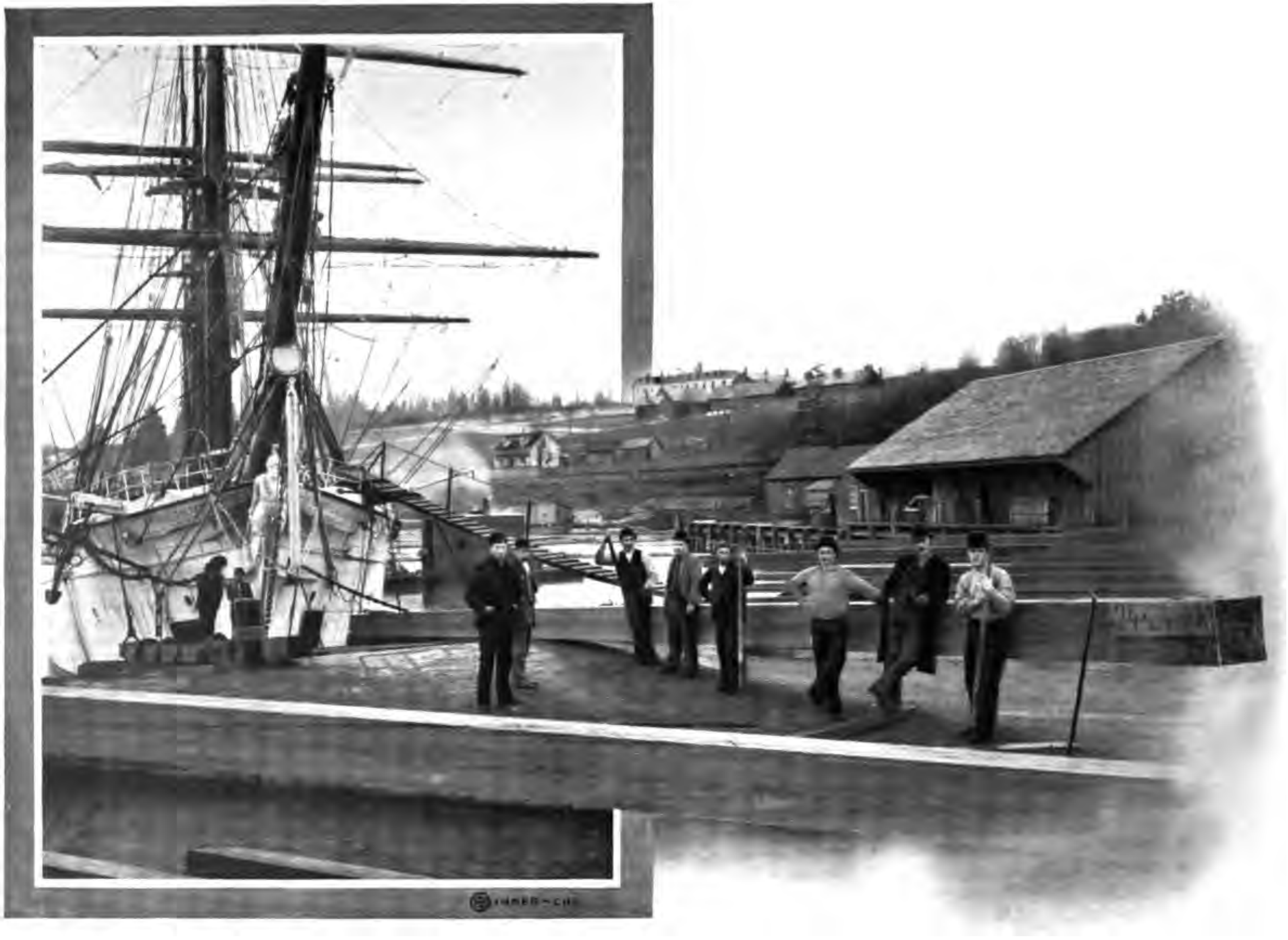
TIMBER.—Alder, maple, arbutus, willow, wild cherry, several varieties of pine and cedar, balsam, but no spruce, and hemlock scarce.

NOXIOUS ANIMALS AND ANIMAL PESTS.—Nothing worse than mink on this island, not even raccoons.

FOREST FIRES.—Common cause of trouble here is carelessness in not having slashing protected by fire guards, made when fires can be controlled in spring time.

LANDS.—Very little Government land open to pre-emption on this island. Improved farms can be bought from $15 per acre up to $50.

LABOUR.—White labourers are few, $1.50 to $2 per day, without board; Japanese, $6 to $15 per month, and board. Too many Japs, and unsatisfactory as farm labourers anyhow.



LOADING LARGE TIMBER ON SAILING SHIPS, HASTINGS MILLS.

LEGISLATION AFFECTING AGRICULTURE.

Some of the Provisions of Provincial and other Acts relating to Agriculture.

LANDS.

Pre-emption.

Crown lands, where such a system is practicable, are laid off and surveyed into quadrilateral townships, containing thirty-six sections, of one mile square in each.

Any person being the head of a family, a widow, or single man over the age of eighteen years, and being a British subject, or any alien, upon his making a declaration of his intention to become a British subject, may for agricultural purposes record any tract of unoccupied and unreserved Crown lands (not being an Indian settlement) not exceeding three hundred and twenty acres in extent in that portion of the Province situated to the northward and eastward of the Cascade or Coast Range of Mountains, and one hundred and sixty acres in extent in the rest of the Province.

The pre-emptor must, within thirty days after the date of the certificate of record, enter into occupation of the land so recorded.

Occupation means a continuous bonâ fide personal residence of the pre-emptor, or of his family, on the land recorded by him.

Price to be paid by pre-emptors is one dollar per acre, in four annual instalments of twenty-five cents each, the first instalment to be paid in two years from date of record.

Purchase.

Crown land may be purchased in no greater blocks than six hundred and forty acres for each person.

Lands which are suitable for agricultural purposes, or which are capable of being brought under cultivation profitably, or which are wild hay meadow lands, rank as and are considered to be first class lands. Lands which are suitable for agricultural purposes only when artificially irrigated, and which do not contain timber valuable for lumbering purposes, as defined below, rank as and are considered to be second class lands. Mountainous and rocky tracts of land which are wholly unfit for agricultural purposes, and which cannot, under any reasonable conditions, be brought under cultivation, and which do not contain timber suitable for lumbering purposes, as defined below, or hay meadows, rank as and are considered to be third class or pastoral lands. Timber lands (that is lands which contain milling timber to the average extent of eight thousand feet per acre west of the Cascades, and five thousand feet per acre east of the Cascades, to each one hundred and sixty acres), are not open for sale.

The minimum price of first class lands is five dollars per acre; that of second class lands, two dollars and fifty cents per acre, and that of third class lands, one dollar per acre: Provided, however, that the Chief Commissioner may for any reason increase the price of any lands above the said prices.

Leases.

Leases (containing such covenants and conditions as may be thought advisable) of Crown lands may be granted by the Lieutenant-Governor in Council for the following purposes:—

(*a.*) For the purposes of cutting hay thereon, for a term of not exceeding ten years:

(*b.*) For any purposes whatsoever, except cutting hay as aforesaid, for a term not exceeding twenty-one years.

WATER.

Bonâ fide cultivators may record and divert any unrecorded water from any natural source for purposes of irrigation.

DRAINAGE, DYKING AND IRRIGATION.

A majority in interest and number of the proprietors of any swamp or meadow lands may select commissioners, and, under certain conditions, proceed in works of reclamation, by borrowing money, and levying a rate on all lands benefited.

ANIMALS.

Restrictions upon Animals running at large.

It is not lawful to allow the following animals to run at large at the times following, that is to say:—

(*a*.) Swine at any time of the year; or

(*b*.) Stallions of one year old or upwards at any time of the year, to the west of the Cascades; and stallions of two years old and upwards from the first day of August to the first day of May, to the east of the Cascades; or

(*c*.) Bulls over nine months old from the first day of December to the first day of June, east of the Cascades, or at any time west of the Cascades.

The "Wild Horse Act" only applies to that part of the Province lying to the east of the Cascade Range of Mountains.

Killing of Unbranded Stallions.

It is lawful for any person licensed by the Government to shoot or otherwise destroy any unbranded stallion over the age of twenty months which may be running at large upon the public lands, provided that such person has theretofore unsuccessfully used reasonable endeavours to capture such stallion.

Any person having killed a stallion under the provisions of this Act shall, as soon as possible, report the same to the nearest Government Agent, stating date of killing and locality where killed and description of animal.

Licences to shoot unbranded stallions are issued by the Government Agent of the District, upon such terms and conditions as such Government Agent may indorse upon such licence.

THISTLES.

If any owner, lessee, or occupier of land, upon which land or upon the half of any road adjacent thereto such perennial thistles as are known as Canadian thistles shall be growing, shall not within fourteen days after any notice in writing, signed by any Justice, or officer in charge of the Department of Agriculture, or officer or person duly appointed by him for this purpose, and containing a description of the land intended to be affected thereby, that such perennial thistles are growing upon such land, or upon such adjacent half of any road, shall have been served upon such owner, lessee, or occupier, or left for him at his usual or last known place of abode, effectually destroy all such perennial thistles then growing or being upon such land or upon such adjacent half of the road, every such owner, lessee, or occupier being convicted thereof shall be liable to a penalty not exceeding twenty dollars.

HIGHWAYS.

Preservation of Roadways.

It is unlawful for any waggon or vehicle carrying a load of more than two thousand pounds weight avoirdupois to be drawn or driven on any of the public highways of that portion of the Province of British Columbia situate west of the Cascade range of mountains, unless the tires of such waggon or vehicle shall be at least four inches in width.

FENCES.

Lawful Fences.

A lawful fence must be at least four feet nine inches high throughout, above the general surface of the ground, and substantially constructed of either stone, brick, earth, wood, or iron, or partly of any one or more of these materials; and if made of horizontal bars, boards, or rails, of wood or iron, must consist of such dimensions so as not to leave more than six inches between the several bars or rails respectively, up to the height of three feet from the surface of the ground, and for the remainder of the fence not more than twelve inches between the said bars or rails: Provided, also, that any natural boundary which shall be sufficient to prevent the passage of cattle into enclosures shall be treated as a lawful fence.

Line Fences and Water-courses.

Owners of adjoining lands shall make, keep up and repair a just proportion of the fence which marks the boundary between them, or if there is no fence they shall so make, keep up and repair the same proportion which is to mark such boundary, and when it is in the interest of owners of adjoining lands to open a ditch or water-course for the purpose of letting off surplus water from swamps or low miry lands, in order to enable the owners or occupiers thereof to cultivate or improve the same, such parties shall open a just and fair proportion of such ditch or water-course, and repair and maintain the same according to their several interests.

COMMONS.

The Lieutenant-Governor in Council may, upon the application of two-thirds in number of the residents or land-holders in any part of any polling division in any Electoral District in the Province, proclaim portions of the Crown land in such polling division to be commons on which such land-owners may depasture their cattle or sheep respectively, subject to the provisions of this Act; and the Lieutenant-Governor in Council may from time to time alter, modify, cancel or repeal any such proclamation.

The extent and situation of any such common are defined and proclaimed by the Lieutenant-Governor in Council in the British Columbia Gazette, but in no case must any such common exceed fifty square miles in area, nor be less than fifteen square miles in area.

It is not lawful to depasture cattle and sheep upon the same common.

No cattle, sheep or swine which do not belong to residents or land-owners who are depasturing on the common or commons are allowed to be depastured or kept on any such common or commons, except while being driven from one district to another.

There is levied and paid upon and in respect of the cattle or sheep of every person depasturing or keeping the same upon such common or commons such sums as the Lieutenant-Governor in Council from time to time fixes, which sums respectively must be paid by the person assessed before the fifteenth day of November in each and every year, to such officer as the Lieutenant-Governor in Council appoints. Such sums must not be less than ten cents nor greater than twenty-five cents for each head of cattle so depastured or kept upon such common, nor less than two cents nor greater than five cents for each head of sheep so depastured or kept upon such common.

CO-OPERATIVE CREAMERIES.

It is lawful for the Lieutenant-Governor in Council to advance out of the unappropriated revenue and public moneys of the Province and lend to each company or association now or hereafter duly incorporated for the purpose of erecting, or acquiring and maintaining, managing and operating, within the Province, a creamery or creameries upon the co-operative system, a sum not exceeding two thousand dollars to any one company or association; provided that the aggregate of all such loans shall not at any time exceed fifteen thousand dollars, under the following provisions:—

(1.) That the district within which it is proposed to erect or operate a creamery is competent and fitted for its support, and that there is a reasonable prospect of the same being a financial success:

(2.) That contracts contingent upon the operation of the creamery have been entered into for the supply thereto of the milk of not less than three hundred cows, or that such supply is otherwise sufficiently guaranteed or secured:

(3.) That the location of the creamery is such as to prevent encroachment upon the limits of an established creamery, while allowing a radius to the proposed institution of at least six miles:

(4.) That the subscribed capital of the company or association is sufficient, if fully paid up, to enable the company or association to acquire a site and to erect and thoroughly equip an efficient creamery, of a capacity to use the milk of not less than three hundred cows:

(5.) That the plans of the creamery building and the nature and cost of the proposed plant and equipment be submitted for approval:

In the event of it being made to appear to the Lieutenant-Governor in Council that in the case of any proposed creamery it will be impossible to comply strictly with the requirement contained in sub-section (2), but that the proposed district will afford a sufficient supply of milk to justify the erection of a creamery therein, and that the security offered by the promoters for the return of the loan is ample, the Lieutenant-Governor in Council may authorise a loan to such creamery, notwithstanding that guarantees of a supply of the milk of three hundred cows are not afforded.

Every loan, or the portion thereof for the time being remaining unpaid, shall bear interest at the rate of five per cent. per annum, payable yearly, and the capital sum of the loan shall be repayable and repaid in eight instalments, the first of such instalments to become due and be paid at the expiration of three years from the date of the loan, and the remaining seven instalments to become due and be paid at a corresponding date in each of the seven subsequent years, so that the whole loan shall be paid with interest, within ten years from the date of the loan.

DAIRYING ASSOCIATIONS.

Any five or more persons who desire to associate themselves together for either or all of the purposes following, that is to say:—

(*a.*) The manufacturing of cheese and butter:

(*b.*) The keeping of swine, and the manufacture and sale of the various products resulting therefrom: and

(*c.*) The dealing in swine and cattle foods for the purpose of supplying such foods to the patrons of such association—

may make, sign and acknowledge before a Notary Public, Commissioner or Justice of the Peace, in duplicate, and file in the office of the Registrar of the Registry District in which the business is to be carried on, a certificate in writing, in the form mentioned in the Schedule to the Act, or to the same effect, together with the rules and regulations signed by such persons respectively.

INCORPORATION OF AGRICULTURAL, HORTICULTURAL AND FRUIT-GROWERS' ASSOCIATIONS.

Any number of persons may unite themselves into a society for the protection and advancement of agricultural, horticultural or fruit-growing interests within any portion of the Province, under the provisions of the Act.

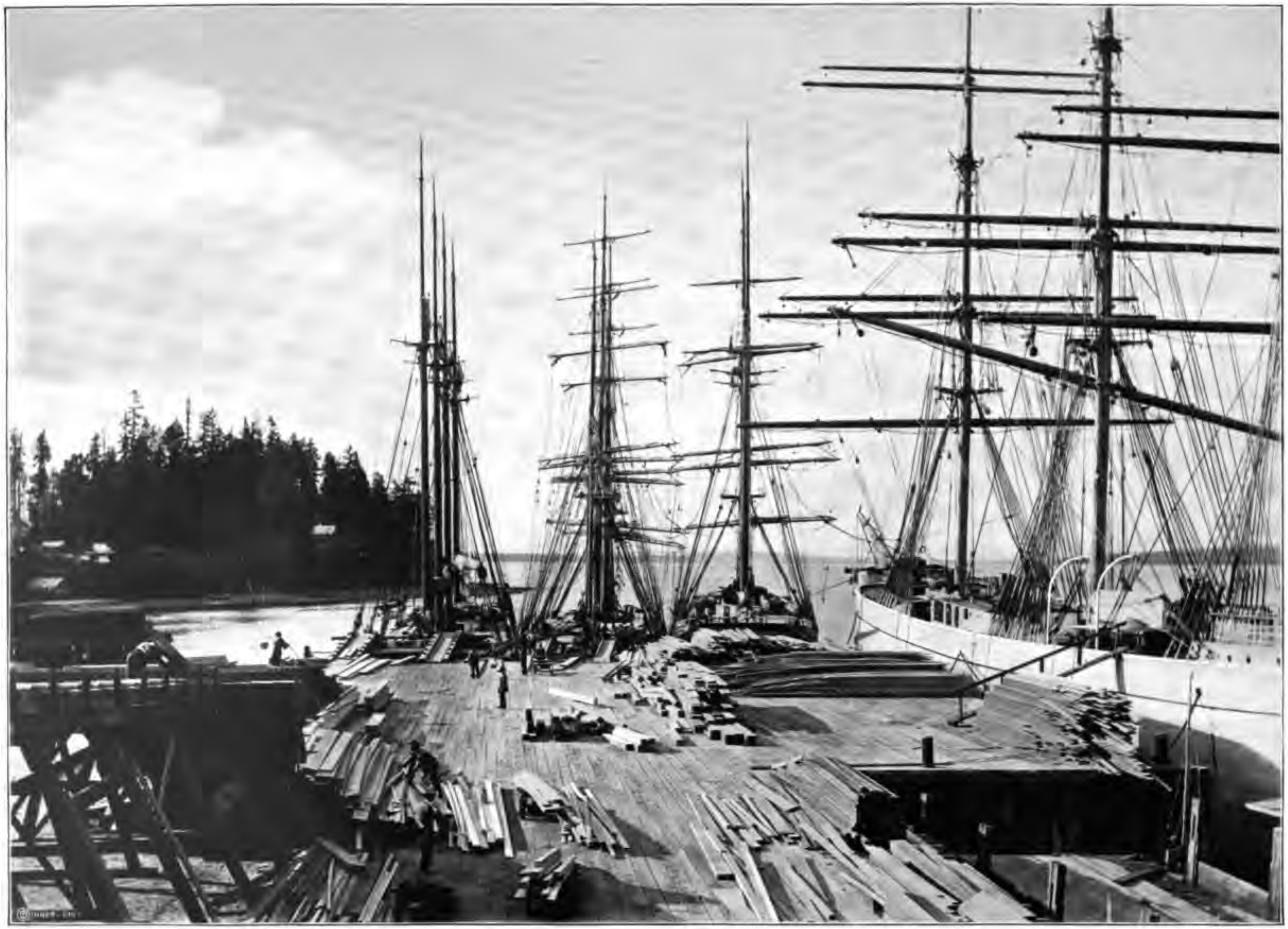
Horticultural Board.

Under the provisions of the "Horticultural Board Act," there is created a Provincial Board of Horticulture, to consist of two *ex-officio* members, viz., the Minister of Agriculture and the Deputy Minister of Agriculture (who shall act as Secretary of the Board) and three members, who shall be appointed by the Lieutenant-Governor in Council, one from each of the horticultural districts which are created, for the purpose of preventing the spread of contagious diseases in orchards and gardens and among fruits and fruit trees, and for the prevention, treatment, cure and extirpation of fruit pests and the diseases of fruits and fruit trees, and for the disinfection of grafts, scions, or orchard débris, empty fruit boxes or packages, and other suspected material or transportable articles dangerous to orchards, fruits and fruit trees; said Board may make regulations for the inspection and disinfection or destruction thereof, or of non-fruit-bearing trees or shrubs which may carry contagion, and also for requiring all cases of contagious diseases or fruit pests, as aforesaid, to be reported to the Board.

FARMERS' INSTITUTES.

Under an "Act providing for the establishment of Farmers' Institutes," the Province is divided into three divisions, as follows:—

No. 1—Vancouver Island and adjacent islands and the Mainland coast contiguous, as follows:—Including Alberni, Comox, Cowichan, Nanaimo and Cedar District, Victoria District (electoral divisions of Esquimalt, South Victoria and North Victoria) and Salt Spring Island.



LOADING LUMBER ON SAILING SHIPS, CHEMAINUS.

No. 2—Westminster District, made up of Delta, Surrey, Langley, Richmond, Burrard, Mission, Chilliwack, Kent, Maple Ridge (Maple Ridge and Coquitlam) and Matsqui.

No. 3—Interior, including Okanagan (East Yale), Kamloops (North Yale), Lillooet (East and West Lillooet), Cariboo and Kootenay.

Institutes may be organised by petition to the Minister of Agriculture, signed by 15 persons resident in any district in which it is proposed to organise.

The objects of these Institutes are the encouragement and improvement of agriculture, horticulture, arboriculture, manufactures, and the other useful arts. The annual fee of each member is 50 cents, which the Government supplements as follows:—To each Institute whose membership can be shown to amount to 15 to 100, a sum of 50 cents for each paid-up member, and 25 cents for each paid-up member over 100, the grant being made conditional, upon all the provisions of the Act being complied with.

Each member of an Institute is entitled to receive a copy of all publications published by or issued under the authority of the Department of Agriculture.

Each district, as above mentioned, is entitled to a separate Institute, and each Institute is entitled to a delegate to the Central Farmers' Institute, which meets once a year at the call of the Superintendent. Each Institute is entitled to two regular meetings during the year, to which expert speakers are sent at the expense of the Government. In addition, each Institute must hold at least two supplementary meetings, partly at their own expense.

Dominion Regulations Relating to the Inspection of Stock Entering Canada.

The following excerpts from the Order in Council of the 25th January, 1897 (which repealed the ninety days' quarantine imposed previously, and which repeal was so earnestly protested against by the stock-raisers of this Province), relate particularly to British Columbia:

Whereas a Memorandum of Agreement concerning changes in quarantine of animals between the United States and Canada, dated at Washington, D.C., December 18th, 1896, having been approved by His Excellency in Council on the 12th January, 1897, it is deemed desirable and important that effect be given thereto from the 1st February, 1897:

And whereas, to admit of this, it is necessary that the present Cattle Quarantine Regulations be amended:

His Excellency, under provisions of Chapter 69 of the Revised Statutes of Canada, intituled "An Act respecting Infectious or Contagious Diseases affecting Animals" (as amended by chapter 13, 59 Vict.), and by and with the advice of the Queen's Privy Council for Canada, is pleased to order that all previous Orders in Council relating to contagious diseases among animals, and health of animals, shall be, and the same are hereby rescinded, excepting that portion of the Order in Council of the 12th May, 1888, being chapter 7 of the Consolidated Orders in Council of Canada, referring to the disease of sheep scab, and contained in sections 35 to 52, inclusive, of the said Consolidated Order, and the following substituted therefor, and to take effect from the 1st day of February, 1897.

The following are hereby declared Cattle Quarantine Stations:—

12—Kootenay, B. C.
13—Bedlington, B. C.
14—Waneta, B. C.
15—Fort Sheppard, B. C.
16—Osoyoos, B. C.
17—Huntingdon, B. C.
18—Douglas, B. C.
19—New Westminster, B. C.
20—Vancouver, B. C.
21—Victoria, B. C.

No regular cattle quarantine stations have as yet been established in British Columbia, but it is proposed to establish seven stations at the following points respectively:—

(*a.*) *Kootenay*, a customs port on the east side of the Kootenay River, close to the International Boundary. A suitable place to be selected.

(*b.*) *Bedlington*, a customs port on the east side of the Kootenay River, south of Kootenay, close to the International Boundary. A suitable site to be selected.

(*c.*) *Waneta*, a customs port on the east side of the Columbia River, a few miles north of the International Boundary. A suitable site to be selected.

(*d.*) *Fort Sheppard*, on the west side of the Columbia River, on the International Boundary, a few miles south-west of Waneta. A suitable site to be selected.

(*e.*) *Osoyoos*, a customs port on the International Boundary, on Lake Osoyoos. A suitable site to be selected.

(*f.*) *Huntingdon*, a customs port on the International Boundary, and a railway junction, some two hundred miles west of Osoyoos.

(*g.*) *Douglas.*

(*h.*) *New Westminster.*

(*i.*) *Vancouver.*

(*j.*) *Victoria*, a suitable site to be selected.

The Minister of Agriculture is hereby empowered to cancel, as quarantine stations, any of the places above mentioned, and to select such other sites in exchange for, or in addition to the above, as he may from time to time deem expedient.

IMPORTATION AND QUARANTINE.

Australasia and the Orient.

Section 3. The importation of animals from Australasia and the Orient through Pacific Ocean Ports is prohibited, except at Vancouver and Victoria.

IMPORTATION OF ANIMALS FROM THE UNITED STATES.

Breeding Stock.

Sec. 21. All cattle to be admitted for breeding purposes shall be accompanied by—

(*a.*) A declaration made by the importer that they are actually for breeding and no other purposes.

(*b.*) A certificate signed by a Government Veterinarian that they have been subjected to the tuberculin test and found free from tuberculosis. Such certificates must show the date of testing and chart of reaction, with a description of the animal, giving age and markings. The importer may be required to swear that the certificate refers to the animal represented.

(*c.*) A certificate of inspection, signed by a Government Veterinarian, showing that the animals are free from contagious disease, and that no contagious disease of cattle (excepting tuberculosis and actinomycosis) exists in the district whence they came.

(*d.*) When not accompanied by such certificates, the animal or animals must be detained in quarantine one week, and subject to the tuberculin test.

(*e.*) Should they be found tuberculous, they must be returned to the country from which shipped, or slaughtered without compensation.

Fat Cattle and Cattle for Feeding, including Range Cattle for Stocking Ranches.

Sec. 22. This class of animals shall be accompanied by a certificate of inspection, signed by an Official Veterinarian, showing that the animals are free from contagious disease, and that no contagious disease of cattle (excepting tuberculosis and actinomycosis) exists in the district from whence they came.

Settlers' Cattle.

Sec. 23. Settlers' cattle, when accompanied by certificates of health, to be admitted without detention; unaccompanied, they must be inspected. Inspectors may subject any cattle showing symptoms of tuberculosis to the tuberculin test before allowing them to enter.

Sec. 24. Any cattle found tuberculous to be returned to the United States or killed without indemnity.

Swine.

Sec. 25. Swine may be admitted for breeding purposes, subject to a quarantine of fifteen days.

Sec. 26. Swine may be admitted when forming part of settlers' effects, when accompanied by a certificate that swine plague or hog cholera has not existed in the district whence they came for six months preceding the date of shipment; when not accompanied by such certificate, they must be subject to inspection at port of entry. If found diseased, to be slaughtered without compensation.

Swine for Slaughter in Bond.

Sec. 27. Swine may be imported into Canada without inspection for the purpose of being slaughtered; the importer shall enter the same for warehouse upon the usual form of such entries, stating upon its face the number, live weight, and value of the herd, and the rate and amount of duty as prescribed by the tariff in force at the time of making such entry. Such importer shall then execute a bond to the Queen, with two sufficient sureties, to the satisfaction of the Collector of Customs at the port where such carcasses are imported or warehoused, in double the amount of such duty; the condition of such bond shall be that upon due exportation, within one year, of the products of the swine so imported, slaughtered and cured in the form of pork, bacon, hams, shoulders, lard, and payment of duty secured by the said bond, then the said bond shall become null and void, otherwise shall remain in full force and virtue.

Sec. 28. After the reception of the swine into the bonding warehouse or slaughterhouse, it shall not be lawful to remove any of them alive therefrom under any pretence or for any reason whatever.

Sec. 29. The product of such swine, after having been slaughtered, shall not be removed for any purpose from the bonding place without a permit from the Collector or proper Officer of Customs, as in the case of all other bonded goods.

Sec. 37. Swine may be imported at any customs warehousing port of entry in Canada, in bond, subject in all respects to the provisions in relation thereto contained in "this Order."

Sheep.

Sec. 38. Sheep for breeding and feeding purposes may be admitted subject to inspection at port of entry, and must be accompanied by certificate, signed by a Government Inspector, that sheep scab has not existed in the district in which they have been fed for six months preceding the date of importation. If disease is discovered to exist in them, they may be returned or slaughtered.

Sec. 39. Sheep for slaughter will be admitted without certificate or inspection.

Horses and Mules.

Sec. 40. Horses may be admitted for general purposes, for sale, or for stocking ranches, and also cow ponies for cattle ranches, or horses which form part of settlers' effects, on inspection at port of entry only.

Sec. 41. Horses may be admitted for racing, show, exhibition or breeding purposes, on inspection at port of entry.

(N.B.—Inspection of horses admitted under the above clauses shall not be enforced unless ordered by the Minister of Agriculture, when deemed expedient or necessary.)

Sec. 43. Horses may be admitted for temporary stay, teaming, or pleasure driving at points along the frontier for a period not exceeding one week, on permit by the Customs Officer at port of entry; such permit may be extended for one week, but no longer. Should he observe nasal discharges or other evidence of disease, he may detain the animals and report the circumstances to the District Inspector, who will decide whether the animal will be admitted or not.

Sec. 44. Horses used for riding or driving to or from points in Manitoba, North-West Territories or British Columbia, on business in connection with the stock-raising or mining business, and horses belonging to Indian tribes, may be admitted without inspection, but must report to Customs Officer both when going out and coming in.

Exportation.

Sec. 47. No animal shall be permitted to be placed on board any steamship or other vessel for exportation at any Canadian port till they have been inspected by a duly authorised veterinary at such port, and certified by him to be free from contagious disease; such inspection to be made within twenty-four hours of embarkation.

Sec. 48. All animals for exportation by sea must reach the port of exportation eighteen hours before shipment, for rest and inspection; and in order to enable the Inspector to make a careful, individual examination, owners of such animals must notify him at least twenty-four hours before embarkation. Such notice must be in writing, and sent to the office of the Inspector.

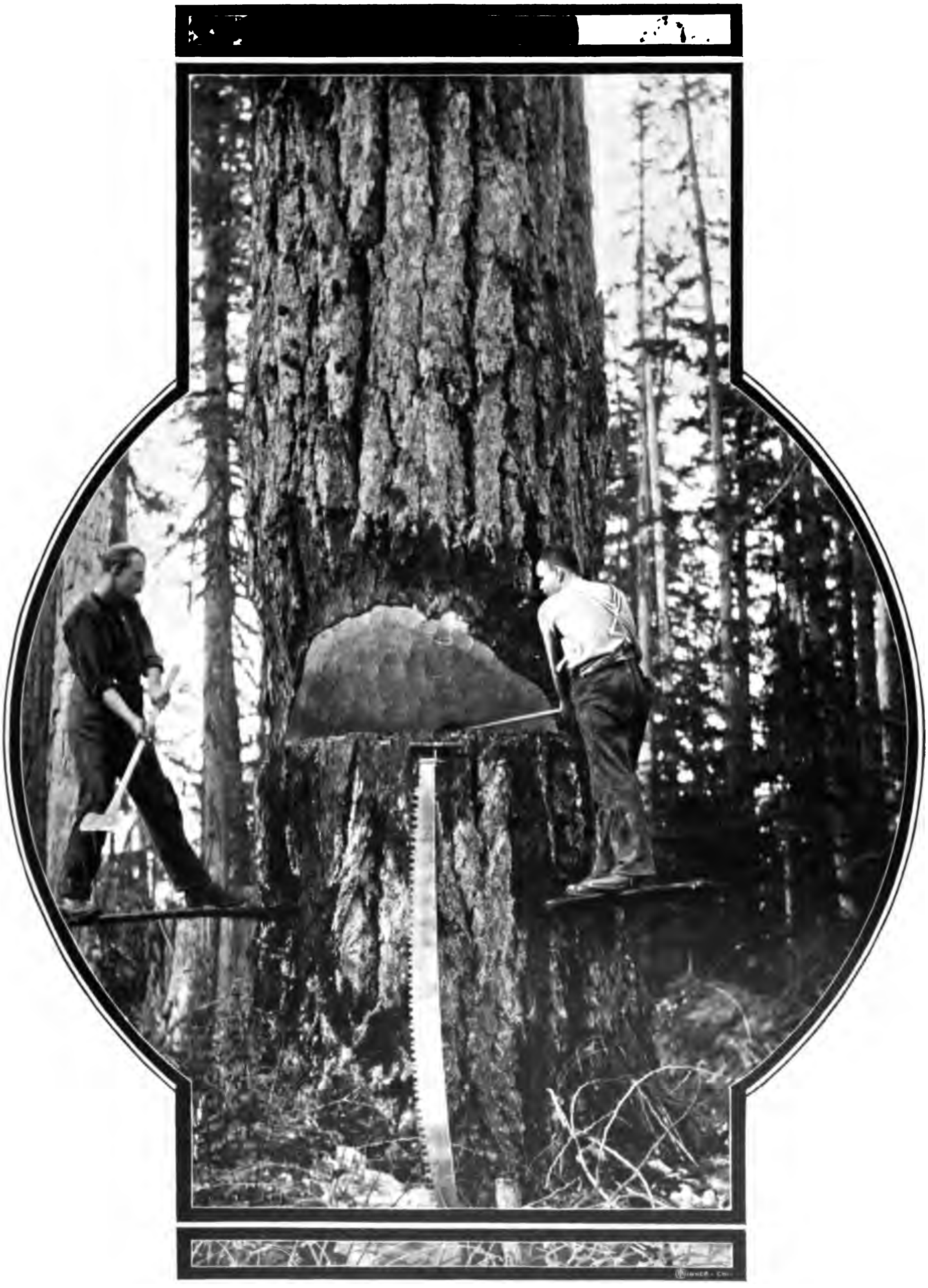
Free Goods.

(*From Canadian Customs Tariff.*)

Wearing apparel, household furniture, books, implements and tools of trade, occupation, or employment, musical instruments, domestic sewing machines, live stock, carts and other vehicles and agricultural implements in use by the settler for at least six months before his removal to Canada, not to include machinery or articles imported for any use in any manufacturing establishment or for sale; also books, pictures, family plate or furniture, personal effects and heirlooms left by bequest: Provided that any dutiable article entered as settlers' effects may not be so entered unless brought with the settler on his first arrival, and shall not be sold or otherwise disposed of without payment of duty until twelve months' actual use in Canada: Provided, also, that under regulations to be made by the Controller of Customs, live stock, when imported into Manitoba or the North-west Territory by intending settlers, shall be free until otherwise ordered by the Governor in Council.

The following is the authorised number of live stock allowed to be imported under the conditions of the excerpt above quoted:—

Horses, one to every ten acres, 16 in all allowed; cattle, the same; sheep, one to each acre, 160 in all allowed; swine, the same.



HEWING DOWN A DOUGLAS FIR.

British Columbia – Department of Agriculture

FORESTRY.

In view of the intimate relations between the forests and water supply, and, therefore, of their bearing on the plant growth of a country, and also of the enormous value of our timber wealth to all classes of our people, including agriculturists, I reproduce the following articles, which, I trust, will be of some service and lead to further and renewed efforts, whereby the continued destruction of our forests by wasteful methods, carelessness and, above all, forest fires, may be averted, or, at least, lessened :—

Forestry in British Columbia.

By J. R. Anderson, Deputy Minister of Agriculture.

(Written for the Canadian Forestry Association, and read at the meeting of that body at Ottawa on the 7th March, 1901.)

At the present time, British Columbia probably possesses within its limits larger unbroken areas of primeval forest than any other country in the world, and is destined in the near future to be the principal source of supply of timber and wood pulp. Hence the question arises how best to conserve our forest wealth to the best advantage and for the greatest good.

British Columbia, it must be premised, is a Province of vast extent, extending, as it does, from the forty-ninth degree of latitude on its southern boundary to the sixtieth degree on its northern boundary, bounded on the west by the Pacific Ocean, and on the east by the 120th degree of longitude and the Rocky Mountains.

The climatic conditions within this great area, owing to natural causes, it can easily be imagined, are most variable, and calculated to suit the requirements of many different kinds of forest trees. Amongst the most prominent of them, I make mention of the following. And here I may explain that the descriptions are largely quotations from a report I made some years ago at the request of the Admiralty, and will serve to some extent to give an idea of the forestry resources of British Columbia. I reproduce my remarks with all diffidence, and subject to correction, as I am quite aware of my liability to err in statements involving interests of such magnitude.

Without doubt, the timber of greatest economic value in the Province, and of which there is the greatest quantity and most generally distributed, is the Douglas Fir, sometimes called Red Fir and Oregon Pine; it is now known under the botanical name of *Pseudotsuga Douglasii*—Carr. The synonyms are: *Pinus taxifolia*—Lamb; *Abies Douglasii*—Lindl.; *Abies mucronata*—Raf.; *Pinus Douglasii*—Lamb; *Abies Douglasii*—Lamb; (var. *taxifolia*—Gordon). Its range may be said to practically extend to the whole of the Province, with the exception of Queen Charlotte Islands, where it is said it does not grow, and it accommodates itself to all altitudes from sea level to 6,000 feet; at great altitudes, however, it only grows in a very stunted form. Dawson says: "The best grown specimens are grown near the coast, in proximity to the waters of the many bays and inlets which indent it. Here the tree frequently surpasses eight feet in diameter, at a considerable height above the ground, and reaches a height of from 200 to 300 feet, forming prodigious and dark forests." My own experience is that Dawson is quite right in his remarks, and, therefore, it will readily be seen that the shipping facilities are exceptionally good for the best qualities of this useful timber. Amongst the uses it is put to I may mention house building, ship building, bridging, wharves, piles, masts, furniture, fencing, etc. When growing singly in the open it forms a very beautiful and useful shade tree, the branches starting from near the ground and growing out very thickly all along the stem. It is, however, practically useless for commercial purposes when growing in this form, and it is only useful when growing together in dense forests. In the latter state it grows without branches except at the top, and so yields timber of immense size and strength, without knots, particularly suited for bridging and similar work. In this country it is not particularly liable to attacks of insects and dry rot, except when immersed in the sea, where it (in common with most of the other woods of the country) is subject to the attacks of the *Pennulifera teredo.* When submerged or buried underground away from the influence of the air it is very durable, and will last in these positions for many years; it soon rots, however, if left lying on the ground exposed to damp. The usual methods of seasoning for ordinary purposes is by piling the manufactured wood in the open air and allowing a free circulation of air to pass through the pieces. When used for furniture and cabinet-making it is usually seasoned in a hot air chamber. As much as 508,000 feet of good lumber have been cut off one acre in the Comox District, and this although trees under two and over seven feet in diameter were not used. This is by no means the only instance recorded of so large a cut.

The wood next in importance is probably the Cedar, generally known as Red Cedar; it is also sometimes called Yellow Cedar (not to be confounded with Yellow Cypress or Cedar); botanically, it is known as *Thuya gigantea*—Nutt. The synonyms are: *Thuya plicata*—Don.; *Thuya Menziesii*—Dougl. This tree is very generally distributed on Vancouver Island and the coast of the Mainland to the westward of the Coast Range. Scarce in the dry central plateau, it, however, again occurs in considerable quantities in the Selkirks and Gold Ranges of the mountains. As in the case of the Douglas Fir, the finest specimens are to be obtained in proximity to the sea coast. Here the trees attain an immense size, some idea of which may be formed from the fact that some of the native canoes, which are all hewn out of the trunks, are six feet and more from the level of the gunwale to the bottom. An Indian plank hewn out of this wood is at present in the Museum here, the dimensions of which are 5 feet wide by 15 feet long, and this is by no means anything like as wide as others on the West Coast. Although second in importance as regards its economic value, it is a more valuable wood than the Douglas Fir, being used principally for interior finishings, cabinet-making, doors, shingles and posts. It is very ornamental when properly finished, splits well and lasts a long time in the ground. In a specimen bundle of split shingles sent by this Department to the Chicago Exhibition, each shingle measured twenty-two inches wide; and split boards quite straight from twelve to fifteen inches wide and twelve feet long. As regards attacks of insects, dry rot, seasoning and accessibility for transportation, my remarks under Douglas Fir will also answer for this wood. As an ornamental tree it has few equals, and it is certainly the finest of our native trees.

Very little below Cedar as regards its economic value is the Spruce, botanically known as *Picea sitchensis*—Carr, with the synonyms of: *Pinus sitchensis*—Bong.; *Abies Menziesii*—Lindl.; *Pinus Menziesii*—Dougl.; *Abies sitchensis*—Lindley & Gordon.

Dawson says:—"This tree seems to be confined chiefly to the immediate vicinity of the coast of British Columbia, where it attains a large size."

It grows in quantities in all low-lying land in the vicinity of the coast, and is therefore easily accessible for transportation. Its height is not so great as that of the Douglas Fir, but, if anything, it is larger at the butt; I myself saw one which measured nearly sixteen feet in diameter. The wood of this tree is very white and light, resembling White Pine, but is more elastic and will bend with the grain without splitting. It is, therefore, much used in boat building, light, spoon-bladed oars, boxes, shelving and interior work. It lasts a long time without decaying, and is an equally good insect resistant as the Douglas Fir. As the shrinkage is usually very great, it is generally kiln-dried before using, or kept stored away until it is thoroughly seasoned. On account of the sharp-pointed, short fronds, it is quite impossible to grasp them with the naked hand, and this renders this tree easily distinguished from the other British Columbia *coniferæ.*

The Yellow Cedar or Yellow Cypress probably ranks next in its economic value. It is known botanically under the name of *Thuya excelsa*—Bong., and the synonyms of: *Cupressus Nutkœnsis*—Hook; *Chamœcyparis Nutkœnsis*—Spach. This tree is not nearly so plentiful as any of the foregoing, its range being confined to the coast ranges of the Mainland and Islands, generally at a considerable elevation in the southern part of the Province, where it occurs in no great quantities. On Queen Charlotte Islands, however, Dr. Dawson says, it is abundant and reaches the sea level; it there also attains a size of six feet and more in diameter. In my experience I have seldom seen it over four feet. On account of its beautiful colour and close grain, it takes a high polish and is susceptible of being manufactured into beautiful articles of furniture and interior decorations; hence it commands a much higher price than the woods previously mentioned. It is highly esteemed for ship-building, as it is very durable, and it is generally credited, on account of its strong, pungent, but rather agreeable odour, to be *teredo* resistant; of this, however, I am not prepared to vouch. The natives of the northern part of the Province use it largely for paddles, carvings, boxes and articles of domestic use. It is said that on account of its liability to shrink lengthwise, as well as laterally it requires to be well seasoned before use. The expense of bringing this timber to shipping points is somewhat great, except in the northern part of the Province, where it abounds near the sea coast. The long and slender pendulous fronds which hang from the branches, give the tree a very graceful appearance, and the strong, pungent odour which it emits when freshly cut, and which it never loses, renders it very easy of identification.

The Hemlock, known botanically as *Tsuga Mertensiana*—Carr, and its synonyms of: *Pinus Mertensiana*—Bong.; *Pinus Canadensis*—Bong., var. *B.*—Hook; *Abies Mertensiana*—Lindl.; *Abies Albertiana*—Murray; *Pinus Pattoniana*—McNab; *Abies Pattonii*—McNab, is, except the bark, practically unused at the present time. Its range extends over the whole of the Coast line, where it grows to an enormous size in dark, gloomy forests, generally barren of other vegetation, except scattered bushes of the whortle-berry (*Vaccinium parvifolium*), with a thick carpet of moss covering the ground. The bark is extensively used for tanning, but the wood, although good for inside work, is liable to decay when exposed to wet. It is but fair to say that partly on account of the abundance of other coniferous woods, and the prejudice existing against it, it has never been fairly tested, and it is quite possible it may possess unexpected virtues. As its habitat is generally at no great distance from the sea, it is a wood which could be transported to shipping points without great expense. When young or growing singly, the tree is decidedly pretty, and the yew-like fronds which enshroud the trunk form a most welcome and soft bed for the weary prospector or trapper.

The Western White Fir or Balsam Fir, *Abies grandis*—Lindl., and its synonyms of: *Pinus grandis*—Dougl.; *Picea grandis*—Loudon; *Abies Gordoniana*—Carr; *Abies amabilis*—Murray, is quite common in the vicinity of the Coast and grows to a large size, but the wood is held in small esteem, being perishable and brittle; it is, however, white and light, and may in course of time be put to use for boxes, &c. The bark, when young, is thickly covered with large bladders or cells filled with a liquid, resinous gum, which has great healing properties. The tree, with its thick, flat fronds and rigid growth, although grand in appearance, is rather too stiff and formal, and of the Noah's Ark type, to be quite pleasing.

The Western White Pine, known as *Pinus Monticola*—Dougl., with its synonyms of: *Pinus Strobus*—Dougl., var. *Monticola*—Nutt; *Pinus porphyrocarpa*—Lawson; *Pinus Strobus*—Hook.

Dr. Dawson says: "It is found in scattered groups, but in no great quantities, on the slopes of the mountains of the interior where the rainfall is plentiful, and in certain parts of the interior of Vancouver Island it is abundant, and is found in all parts of the southern protions of the Coast Range, where there is an abundant rainfall." This wood is nearly identical with and nearly equal to the "King of Woods," as it is called, the White Pine, *Pinus Strobus* of Eastern Canada. It has, however, thus far been but little utilised, partly on account of the difficulty of getting it in sufficient quantities all together, and partly on account of the expense of transporting it to shipping points. It is the most useful wood for window sashes, doors, powder barrels and similar work. Being a white and very light wood, it is unsuitable for outside work, and has a tendency to absorb moisture when in contact with the ground, and is, therefore, liable to decay. It is a very grand-looking tree, with long, bluish-green fronds and cones from 8 to 12 inches long.

The other coniferae of the Province do not, in my opinion, require special descriptions, growing, as they do, in comparatively limited quantities, many of them in the interior of the country and only used in default of better timber. Some of the principal varieties are:

Western Yellow Pine or Bull Pine, *Pinus ponderosa*—Dougl.; synonym, *Pinus resinosa*—Hook. Its habitat is the dry plateau of the Interior Mainland, between the Coast and Gold Ranges. A remarkably handsome tree, with smooth, red bark, very large fronds and long cones bearing a large quantity of seed, which the natives formerly used as an article of food.

Scrub Pine, *Pinus Contorta*—Dougl.; synonyms, *Pinus inops*—Hook; *Pinus banksiana*—Lindl. and Gordon. Its habitat is everywhere in the Province on sandy points and exposed, rocky points, seldom growing larger than fifteen inches, quite useless for timber and not at all ornamental.

Black Pine, *Pinus Murrayana*—Balfour: synonyms: *Pinus contorta*—Macoun; *Pinus contorta*, var. *latifolia*—Dawson; *P. inops*—Hook. Its habitat is on the slopes of the mountains of the interior of the Province, where it grows in dense masses very straight and long, but of no great size. Most useful for mining purposes, being strong and durable and the only wood procurable in many of the mining districts. It is said to make excellent charcoal, the only coniferous wood, to my knowledge, that is used for the purpose.

Larch or Western Tamarack—*Larix occidentalis*—Nutt; synonyms: *Pinus laryx*—Dougl.; *Pinus Nuttallii*—Parlatore. On the slopes of the mountains of the interior Mainland, and is used for rails, interior fittings and shakes or shingles, where cedar is not available.

There are several other coniferous trees of the fir or pine and juniper order which I do not think are necessary to mention particularly.

Broad-leaved Maple, *Acer Macrophyllum*—Pursh. This is probably the commonest and best of our deciduous woods. Its range is all over the lower lands of Vancouver Island, the Gulf Islands, and the Mainland to the westward of the Coast Range. It grows to a large size, the trunks frequently attaining to a diameter of three or four feet, and when growing close together or with other trees, very straight and tall. When growing singly in the open, it forms a magnificent shade tree; one remarkable specimen near Victoria covers a space of probably 80 feet in diameter. The wood is close-grained, takes a fine polish, and is well adapted for furniture, inside finishing and carriage building. That part which, by reason of an abnormal growth, is known as Bird's Eye Maple, is very beautiful. Although used by furniture makers in some cases for inside work, it is comparatively little used, and is only cut by one or two mills to supply the demand.

There are two other native maples, viz.: the Vine Maple, *Acer circinatum*, and another resembling it called *Acer glabrum*. The former is common on the low lands of the Mainland to the westward of the Coast Range, but does not occur to the eastward of the Coast Range, nor on Vancouver or Gulf Islands. As its name implies, it only grows small and crooked, much in the shape of a vine. The latter occurs all over the Province, principally in the dry belt to the eastward of the Coast Range, where it never gets beyond a bush, and on the islands, where it frequently attains to the dignity of a small tree.

Alder, *Alnus Rubra;* synonym, *A. Glutinosa*—Pursh. This is another common tree on Vancouver and Gulf Islands and on the Mainland to the westward of the Coast Range. It attains in many places a diameter of two to three feet, but much of it is under two feet. Growing as it does in close forests, it runs up to a considerable height and is very straight. The wood, which is of a light, brownish colour, nearly white, resembles black walnut in the grain, and is used, stained to the proper shade, to a limited degree in imitation of that wood, for furniture, inside finishing, bannisters, etc.

The only other representative of this genus is the Mountain Alder, *A. rhombifolia*, a worthless variety and more of a shrub than a tree. Its range is general throughout the Province, generally on mountain sides.

Poplar or Cottonwood, *Populus Trichocarpa*, sometimes called *P. Balsamifera*, is a common tree throughout the Province on low-lying lands in the vicinity of water. It attains a large size in favourable localities, three to four feet in diameter being common, and attaining a great height in dense forests along river banks and on low islands. The wood is very little used, being white and soft, without any great quality to recommend it. The principal use it has been put to is for the manufacture of excelsior, for which purpose it is well adapted. It has also been used for boxes, being very light, but the objection to its use for this purpose, I am informed, is that it turns dark after being sawed. Possibly this difficulty could be overcome by allowing the wood to season in the log, or other methods.

Another representative of this genus is the Aspen-leaved Poplar, *P. tremuloides*. Its range is also very wide, occurring, as it does, in all parts of the Province. It does not attain to any great size, twelve inches being about the limit. The principal use it is put to is for fence-rails in that portion of the Province to the eastward of the Coast Range, where other timber is scarce.

Oak, *Quercus Garryana* or *Jacobi*. The range of this tree is altogether confined to Vancouver Island and Gulf Islands, not a single specimen occurring on the Mainland. Patches of it occur at the southern end of Vancouver Island, and for about 150 miles north. In some places it attains a size of from three to four feet in diameter, with good, straight trunks from which logs can be obtained ten to twenty feet in length. It is likewise a highly ornamental shade tree. The wood resembles English oak in appearance, having a beautiful grain, but it has never been much used, principally, I believe, on account of the difficulty of seasoning it properly, or, rather, the want of necessary room and capital for storing it away for several years. It is used to a limited degree by cabinet-makers, etc., for ornamental furniture and other purposes of that kind.

A FOREST SCENE.

Canoe Birch, *Betula Papyrifera*, is common on the Mainland and very scarce on Vancouver Island. The wood is a good, fine-grained, durable one when not exposed to the weather, but it has never been used, to my knowledge, for any purpose but fire-wood. It attains a size of from one foot to eighteen inches in diameter, but is often smaller.

Arbutus, or Madrona, *Arbutus Menziesii.* This is quite a common tree on Vancouver Island and the Gulf Islands and on some parts of the Coast line of the Mainland. It is a striking-looking tree, with its red bark and bright, evergreen leaves. As a rule, it does not attain to a great size, especially when growing on exposed rocks and headlands, but trees a foot in diameter are common, although, as a rule, twisted and crooked; when growing in forests, however, it grows fairly straight and sometimes attains a large size. On the Alberni road, in the vicinity of Nanoose Bay, many fine specimens are to be seen. When travelling in company with Dr. Fletcher and Rev. Mr. Taylor, two years ago, I took the measurement of one tree which was ten feet five inches in circumference. I am not aware that the wood of this tree has been put to any particular use; it is hard, fine and close-grained and takes a good polish, but it is apt to warp and crack if cut before it is well seasoned.

Dog Wood, *Cornus Nuttallii.* A highly ornamental tree with immense white flowers, fairly abundant throughout the islands and the coast of the Mainland. It often attains a size of twelve inches in diameter and a height of thirty feet or thereabouts, and has a fine-grained hard, pinkish wood which takes a good polish. Not used, to my knowledge, except in isolated cases for ornamental work.

Buckthorn (sometimes called Bearberry, and from that often wrongly called Barberry) *Rhamnus Purshiana*, is not an uncommon tree on the islands of Vancouver and the Gulf and on the coast of the Mainland. It attains a size of about a foot in diameter, but more frequently smaller. The wood is of a light yellow colour, close-grained and hard. Not used except for ornamental purposes.

Crab, *Pirus Rivularis*, grows commonly in swamps of the Mainland to the westward of the Coast Range, on Vancouver Island and the Gulf Islands. It seldom attains a larger size than nine inches; the wood is hard and close-grained, and is principally used for rollers in mills and similar purposes.

FOREST PRODUCTS.

The following is from a paper supplied by the Government to the Forestry Commission at Chicago in 1893, but I am not now prepared to vouch for the correctness of the figures:—

The average cut is easily 50,000 feet per acre. On the Mainland and Vancouver Islands it has varied from 20,000 to 500,000 feet per acre. Messrs. King and Casey cut 508,000 feet on one acre in the Comox district. This is not the only instance of so large a cut; and this although trees under two feet and over seven feet were not cut.

Quantity of the Present Limits.

The acreage is at least this year (1893) 400,000. Suppose the average to be 30,000 feet to the acre, this would give 12,000,000,000 feet on the limits now occupied.

Cut per Annum.

In 1892 the cut was 64,000,000 feet. Add for waste and cut unreported, say 40,000,000 feet. This would give 100,000,000 feet. At this rate the present limits would last 120 years. This, however, supposes an average of 30,000 feet per acre, no bush fires, and no increase in the annual output.

It is estimated that fire destroys fully 50 per cent. of the timber. This reduces the time from 120 to 60 years. However, the output must rapidly increase, and will in the near future be treble what it is to-day. At this rate of cutting, the present limits would be worked out in twenty years.

Some say one-third of the limits of the Province is taken up. Suppose the entire acreage (of the average 30,000 feet to the acre) be three times that taken up now. This would give 1,200,000 acres. The time required to cut the entire amount at three times the above output would be 60 years.

Although various causes will hasten the lessening of our forests, the natural growth must add considerably to the amount above stated. The chief element of destruction is fire, which should be guarded against, both by the mill-owners and the Government.

Exports for the Four Years ending June 30th, 1894.

To all countries, including the United Kingdom :—

			Value.
Burrard Inlet	236,054	M feet.	$1,385,980
Victoria	8,352	"	70,541
Nanaimo	6,532	"	55,128
New Westminster	5,900	"	50,012
	156,838	"	$1,561,661

To the United Kingdom alone :—

			Value.
Burrard Inlet	7,161	M feet.	$113,304
Victoria	30	"	255
Nanaimo	836	"	12,180
New Westminster	*Nil.*		
	8,027	"	$125,739

The quantities are approximate, but the values are accurate and include fir, cedar and spruce planks, boards, deals, spars, masts, square timber, laths, poles and posts.

FOREST LEGISLATION.

The provisions of the Acts relating to forests are succinctly as follows :—

Leases of surveyed, unpre-empted Crown timber lands, which have been previously offered to public competition, may be granted by the Lieutenant-Governor in Council for a period not to exceed twenty-one years to any person, for the purpose of cutting spars, timber or lumber, who has tendered the highest cash bonus, subject to the payment of a royalty of fifty cents per thousand feet on the scale measurement of the logs cut on the leased premises, and to the payment in advance of an annual rental of fifteen cents per acre; arrears of rental to bear interest at the rate of five per centum per annum : Subject also to the condition that, when the royalty so chargeable, together with the said rent, amounts to less than fifty cents per acre of the leased lands in any one year, the lessee shall pay such additional amount as will make up the revenue from such leased lands, including the said rent of fifteen cents per acre, to the total amount of fifty cents per acre : Provided, further, that the holder of any such leased lands shall have a properly equipped saw-mill appurtenant to such leasehold, capable of cutting not less than one thousand feet of lumber, in inch boards, per day of twelve hours for each and every four hundred acres of land included in such lease.

The Chief Commissioner of Lands and Works is authorised to grant special licences to cut timber on Crown lands. No such licence is granted for a larger area than one thousand acres, nor for a longer period than one year. Licence costs fifty dollars, and may be renewed at the discretion of the Chief Commissioner. Such licence entitles the holder to all rights of property whatsoever in all trees, timber or lumber within its limits. The Chief Commissioner of Lands and Works is also authorised to grant a general licence to hand-loggers, upon payment of ten dollars, to cut timber upon Crown lands, not being timber limits, without any reservation as to area. Such licence is personal, however, and limited to one year. A ground rent of five cents per acre is charged and a royalty of fifty cents per thousand feet, board measure, for general timber suitable for spars, piles, saw logs, railroad ties, props, shingle bolts of cedar, fir or spruce, and a royalty of twenty-five cents for every cord of other wood.

A drawback is allowed on exported timber, equal to one-half of the royalty. Timber lands (that is, lands which contain milling timber to the average extent of eight thousand feet per acre west of the Cascades, to each one hundred and sixty acres), are not open for sale.

The Chief Commissioner of Lands and Works may enter into an agreement with any incorporated company empowered to manufacture pulp and paper, to grant leases of Crown timber limits, for a term not exceeding twenty-one years, for the purpose of cutting timber for the manufacture of wood pulp or paper.

Under the "Bush Fire Act," any portion of the Province may be created, by Order in Council, a fire district. It is unlawful to start a fire in a fire district between 1st of May and 1st October, except for clearing land, cooking, obtaining warmth, or for some industrial purpose. Precautions must be taken in clearing land not to allow fire to spread, and in other cases fires must be extinguished before leaving. Locomotives are required to have spark-screens on their smoke-stacks.

Now, whilst the provisions of the Acts relating to forest preservation are good as far as they go, the difficulties of enforcing them in a country but sparsely settled are practically inoperative, and the question naturally arises, how can this be remedied? The elaborate and undoubtedly efficient remedies pursued in older countries, notably Germany, are not suited to a wild country; the cost alone of maintaining an army of forest rangers is sufficient to appal any Government undertaking the task, and, after all, would such a system be efficient? I doubt if it would, except to a limited degree. Those areas of forests lying beyond the limits of civilization would still be liable to the devastation of forest fires, set out in many instances by prospectors in search of mineral wealth, in others by carelessness, and in some instances, possibly, by natural causes. Nevertheless, no other system seems apparent, and if properly managed it could, I believe, be made effective in those portions of the Province adjacent to settlements, and where the operations of the lumbermen and woodmen are carried on, and where also, by special taxation, the system might be made self-sustaining.

In conclusion, let me say to those members of the Canadian Forestry Association who have not visited the West, that they have yet to see a forest in all its magnificence, and no other word seems to me to convey a proper idea of a virgin forest of the West. Picture to yourself thousands of trees, Douglas fir predominating, of prodigious size, so close together that it is with difficulty and often impossible for an animal to go between, limbless, except the tops, through which the rays of the sun scarcely penetrate, the ground carpeted with mosses and ferns and the hush of nature all around you, and you can, perhaps, form some idea of a forest in British Columbia.

Dr. Wm. Saunders:—I can quite endorse all Mr. Anderson has said as to the enormous timber resources of the Province of British Columbia. I have visited specially in the district between Victoria and Nanaimo. In going through the forest about 30 or 40 miles from Victoria, on one occasion, I came across a piece of wood where the trees were so thick it was difficult to get about amongst them. One tree had been felled and I made a measurement of it. It was four paces across the stump, or at least 11 feet in diameter. One hundred and sixty-five feet were perfectly clear of branches, and there were 50 or 60 feet of branches above that, making its height over 200 feet. This was representative of a large number there, and did not exceed the others much in size. It impressed me with the idea of the enormous wealth of timber in British Columbia. This forest extends along the coast line. Practically, for 500 miles north from the American boundary there is not much change in the general character of the timber.

While speaking on this point I would like to refer to some experiments in tree planting which have been undertaken at the Experimental Farm, which, I believe, are the only experiments of this kind in British Columbia. The Experimental Farm at Agassiz has an area of 1,100 acres, only 400 of which is valley land, the remaining 700 acres being mountain, having a height of about 1,200 feet. Up the sides of these mountains there are quite considerable areas of land, so large that we have cleared, between the level of the valley and the summit of the mountain immediately in the rear of the buildings of the Experimental Farm, a space for orchards, and have about 1,000 apple and other fruit trees growing. Scattered on the southern slope of the mountain, at the back of the buildings, there are 25,000 or 30,000 young trees, which were planted out when from one to two feet high. These consist of black walnut, hickory, elm, eastern varieties of ash and oak. They grew rapidly, and in a belt which was planted in the valley land they made extraordinary growth, showing that the climate is admirably adapted for such trees. A specimen of black walnut planted in 1889 must be between 30 and 40 feet high, with a very good growth around the trunk. The ferns, which grow so very high on the slopes of the mountains and at the tops, proved a very serious obstacle to growing young trees, unless the ground about them was cleared. This fern is *Pteris aquilina*, var. *lanuginosa*. These had the effect of shadowing and partly smothering the trees. During the past five or six years the trees have made upward growth, and looking at the face of the mountain in the present season you can see the outcrop of the forest trees which have got above the ferns. I have no doubt that in a few more years this will be an interesting experiment, which will show that the trees of the harder woods are adapted for that country. The rapid growth of the hard woods there will not necessarily interfere with the quality of the timber. This is an important point in connection with the future of timber growing in British Columbia. While the natural growth there is something enormous, and it may not pay to go into growing trees to any extent, I think that the planting of hardwood trees on the slopes of the mountains may be a paying branch of business.

Prof. Macoun:—Mr. Chairman, I will not take up much of the time of the meeting, but I may say that I paid particular attention to Mr. Anderson's paper. He gave a thorough description of the forest trees west of the Cascade Mountains. To those acquainted with British Columbia it would be apparent that he says nothing of the interior. Now, I wish to say that his paper is absolutely valuable for the Coast and Vancouver Island. In speaking of Comox, he mentions 508,000 feet as the product of one acre, but they only cut the trees between 2 and 7 feet in diameter. There are trees that run up to 12 feet. Looking at the land near Union Mine, near Comox, there is a tract there where the trees stand like enormous columns with bases of 12 or 15 feet. After the trees rise 5 or 6 feet they slope inwards, and a hole is cut in the trunk and a plank shoved in, on which the chopper stands to fell the larger trees, so that when Mr. Anderson says 508,000 feet to the acre he is quite within bounds.

About the Yellow Cedar and Pine, I want to elaborate Mr. Anderson's statements. The reason he does not say so much on the Yellow Cedar (*Cupressus*) is that it is not found at the Coast in Southern British Columbia and Vancouver Island. You have to go up Mount Benson, at Nanaimo, 1,200 feet, before you reach the belt of Yellow Cedar, and you have to go up 500 feet more before you reach Yellow Pine (*Pinus monticola*), and if you make the ascent I speak of on any mountains in British Columbia west of the Coast Range, you will find this belt of *Pinus monticola*, with sound and perfectly clean trunks and without punk. If you pass through this series of trees you get up into the Hemlock tract, and above this get to a tree he does not speak of at all, *Picea Engelmanni.* This tree is so useful and so valuable that nearly all the bridges and snow-sheds on the Canadian Pacific Railway were built of it. I have seen thirteen ties, each 8 feet long, taken out of one tree.

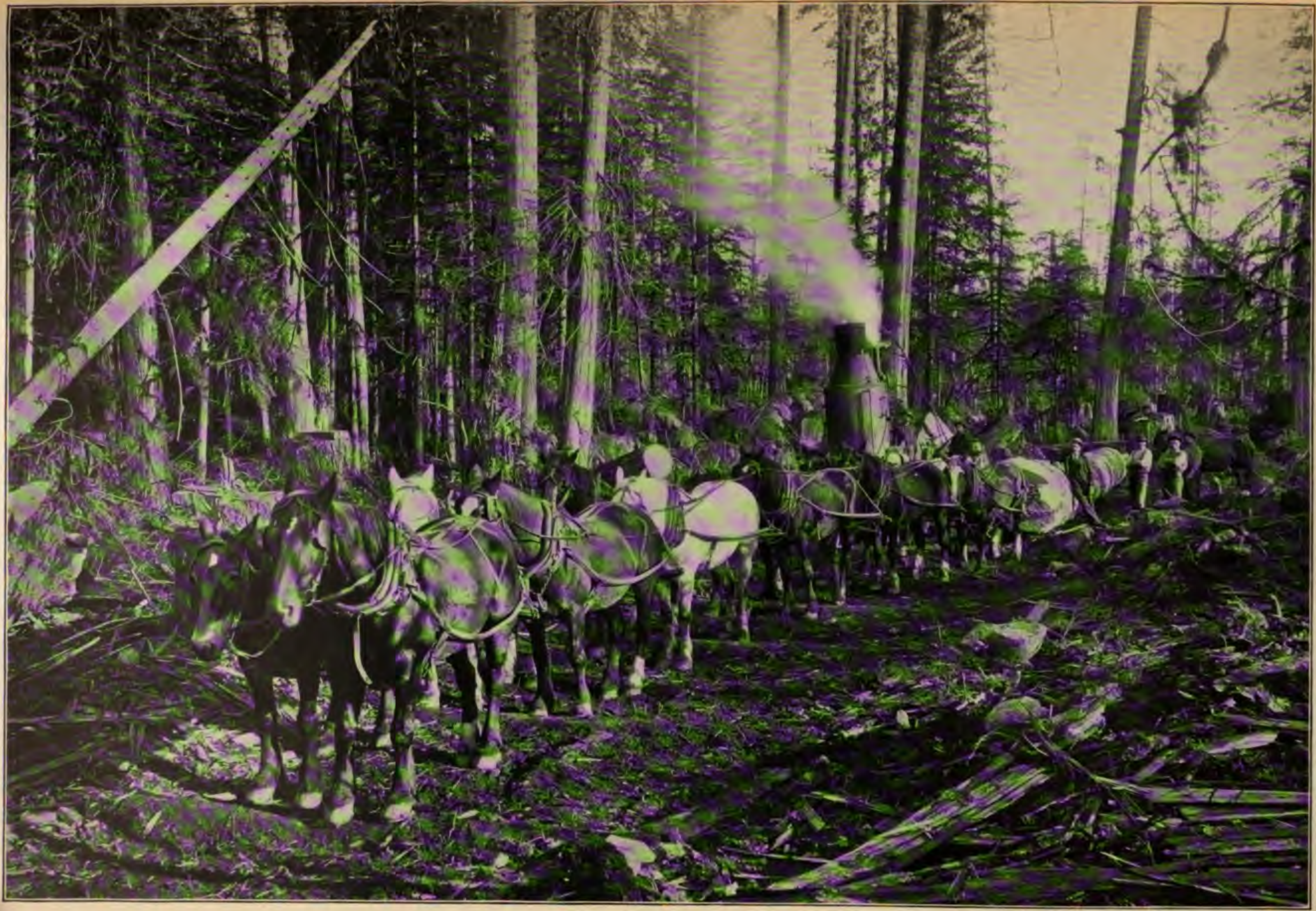
I am not now speaking of the Coast forest at all. This is a forest starting at the boundary, latitude 49°, and extending for 770 miles north from 49° to 60°. Understand that the forests of British Columbia are not confined to the Coast. The Coast is a mere strip; but this central part, which in these mountains is clothed with spruce, extends to latitude 60°, and stretches from the Cascades on the west to the Rocky Mountains on the east, so that it is about 200 to 300 miles in width. When you go toward the Peace River country it gets wider. What kind of timber is there in that country? It is solid spruce forest, white spruce and black spruce, almost identical with the trees we have in the East. The forests are so extensive that northern British Columbia is a preserve in connection with the pulp industry beyond the estimate of any of you who have never seen it. Here the black spruce will run from six to seven inches in diameter. As we proceed west they gradually become larger, so that in the Peace River country I have measured some trees three feet in diameter. I want to increase the value of Mr. Anderson's paper by extending it. Mr. Anderson speaks of the Coast and I speak of the Interior, and I say, just as he says, that British Columbia is timbered beyond the estimate of any individual.

I stood one evening on Mount Arrowsmith, 6,000 feet high, and looked out over a beautiful expanse of country. The next day was windy and fires got up, and looking over that enormous forest you could scarcely see any part not covered with smoke. On Vancouver Island, where the trees can be burned, they are being burned off as quickly as they can be. They can be destroyed in this sense that they cease to grow. They will not be entirely destroyed until there are more fungi there to cause decay. Decay is caused solely by fungi. The fires cannot destroy the northern forest, because they do not get dry enough to burn.

Paper Supply of the Future.

Colonist, 17th April, 1901.

The subject of utilising the immense forests of the Dominion and this Province, suitable for the manufacture of pulp, is one that is attracting more and more attention every year. Canadians are taking a deeper interest, as they are beginning to realise how valuable are those forests whose timber has hitherto yielded but little to the revenue of the country, and which has been very slightly looked upon, as far as its economic usefulness is concerned.



HAULING LOGS OUT OF FOREST.

The day is coming when these forests, of the Province especially, will yield to the public treasury a handsome net income, and will in addition furnish means of livelihood and profit to many additional citizens. Pulp, from which that useful commercial article, paper, is manufactured, is becoming yearly more valuable as the sources hitherto worked are becoming limited in the quantity they are capable of furnishing. The people who are connected with the vast number of trades which use paper in some form in their manufactures are investigating resources for future supplies, and they have in the past year or so been looking over the ground in Canada, with the result that in the East they are looking for a very large development of the industry which is already considerable there.

In this Province, where the beginning has yet to be made in developing the industry, some attention is being paid to it by the Department of Agriculture in its forestry branch. Mr. J. R. Anderson, Deputy Minister of Agriculture, has for some time been taking a great deal of interest in the question of gathering data concerning the forest area of the Province, which would be available for the development of a pulp manufacturing industry, and he has also been in correspondence with the Department at Ottawa regarding the fields of possible market, and as to those who are inquiring for locations to establish pulp-making. The following letter, which Mr. Anderson has received from Mr. Henry Ami, of the Dominion Geological Department, will be read with considerable interest by those who look to see pulp manufacturing added to the paying industries of British Columbia :—

"Ottawa, February 18th, 1901.

"*J. R. Anderson, Esq.*,
"*Deputy of the Minister of Agriculture*
"*for the Province of British Columbia.*

"Hon. and Dear Sir,—In reply to your honoured favour of last week, I have much pleasure in stating that inasmuch as Mr. George Johnson, Dominion Statistician, in the Department of Agriculture at Ottawa, has recently taken up the most important aspects of pulp industry in Canada, and has actually prepared reports thereon, I have asked him to be good enough to communicate with you on the points you mention in your letter.

"There is, no doubt, a big future for Canada in the direction you mention; in fact, the world is looking towards Canada's coniferous forests for its supply of paper for the coming generations, and if Canada will only intelligently and vigorously carry out a prudent, provident policy in connection with this industry, as well as lumbering, there is no doubt that we can control the output in years to come. British Columbia has, as you know, fine coniferous forests. May they be everlasting, and they can be so by careful attention and judiciously enforced legislation. I shall be very happy to communicate to you such information as I have on the questions you ask, as soon as I can get at my papers now in process of classification. The communications from Maine, New York, Ohio, Pennsylvania, Michigan, Wisconsin, the Dakotas and Washington, I shall be glad to submit to you. As I told Sir Henri Joly, your honoured Lieutenant-Governor of British Columbia, who takes such a wise and lively interest in these all-important resources of our Dominion, the result of my correspondence at the time with the authorities of the States of the American Union to the south of us was negative in many respects. It showed that there was little systematic work at the time being carried on, except in New York State, and the main conclusion arrived at was: 'There were but poor depauperated forests left in the United States just south of us.'

"Very respectfully and sincerely yours,
"Henry B. Ami."

Ruinous Consumption of American Forests and the Influence on the Water Supply.

(From the Journal of Commerce of New York.

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But the main ground of objection to the privileges Congress has given to the paper manufacturers—the letters of marque and reprisal which Congress has given to the paper trust to prey upon the book and newspaper trade of the country—being frankly stated, a second reason of a very substantial character is that, although pulp woods are free of duty, for the profit of the paper trust, the duties on pulp and paper stimulate the ruinous consumption of American forests.

Where forests are cut for timber the smaller trees are spared, but the pulp men cut everything down to six inches at the stump, so that the spruce forests ravaged by the papermakers are not perpetuating themselves. The State of New York is endeavouring, by means of the Adirondack Park reservation, to save some of the spruce forests that remain in the country. Many of the states have created forest commissions and have set aside forest reservations. Under national legislation and by virtue of presidential proclamation, there are thirty timber reservations. The National Irrigation Congress, a year and a half ago, and the National Forestry Association, have urged that all public lands more valuable for timber than for cultivation should be absolutely withdrawn from sale by the general government.

The efforts now making on a wide scale to preserve the forests do not spring from altruistic regards for the well-being of the next generation. So far as the future supply of lumber is concerned, the destruction of our forests will only make timber more expensive and lead to a freer use of metals for purposes of construction. It is the farmers' need of rain and the cities' need of drinking water that is inspiring the efforts, legal and scientific, state and national, to retard the destruction of our forests. In England, New York and the older part of the West, the denudation of the soil has already proceeded so far as to seriously diminish the volume of rivers. This has unfavourably affected the water supply of some of our cities, and it is diminishing the amount of evaporation upon which agriculture must depend for its rainfall. It is for the sake of the crops and for the sake of the water supply of towns that efforts are now making to check the reckless destruction of the forests.

The enormous profits that the pulp paper men are making, evidenced by the capitalization of the trust at $55,000,000 and the absorption of mills at a valuation of $22,000 per ton of daily output, while mills with entirely new machinery can be erected at 30 or 40 per cent. of that, offer an immense premium upon the rapid destruction of forests. Persons who are indifferent to the extortion practised by the trust upon the publishers of books and newspapers in order to pay dividends upon a capital, 75 or 80 per cent. of which is fictitious, can appreciate the folly of legislating large rewards into the pockets of the papermakers in order to induce them to exterminate all the spruce in the country at the earliest possible day. If these duties shall be repealed the paper industry will continue to pay ample profits, and the spruce forests of the country will be cut over quite fast enough, but we shall also draw considerably upon the vast forests of Canada for our paper-making material, and the destruction of our own forests will be somewhat retarded; it may be so much retarded as to enable the growth of new timber to keep pace with the old.

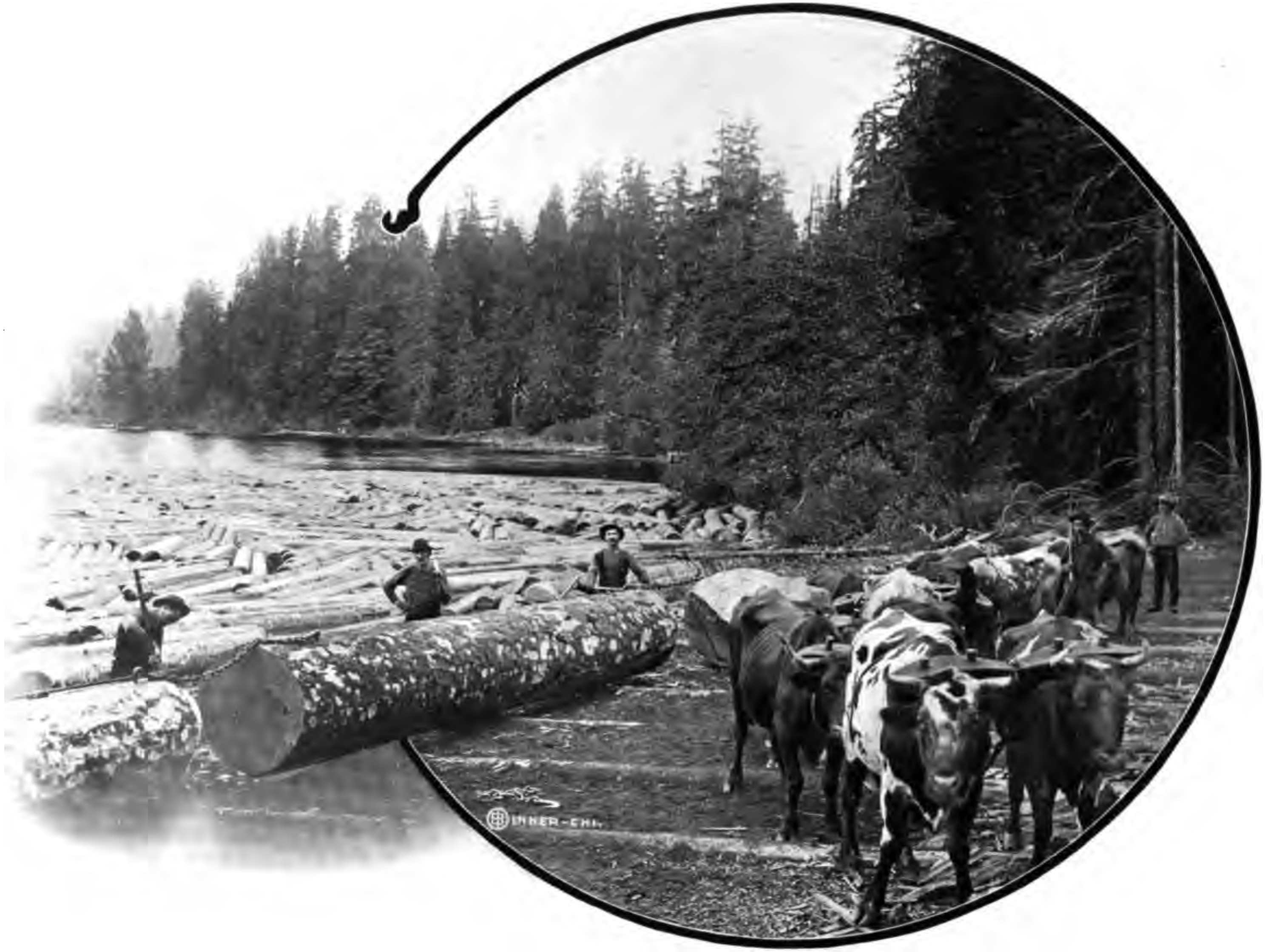
Forests and Reservoirs.

(*American Gardening, October, 1901.*)

At the recent Denver meeting of the American Forestry Association, F. H. Newell, Hydrographer, United States Geological Survey, made a few remarks which should appeal to the interests of all who cultivate the soil. He pointed out that the full development of the resources of the United States, especially of the arid West, rests upon a complete utilisation of the water for irrigation, power, and municipal as well as domestic supply.

Furthermore, the conservation of the waters and protection from pollution, both natural and artificial, rests largely upon the proper treatment of the forests at the headwaters of the streams. There can be no question as to the beneficial influence of these forests, although the extent of this influence may be, and still is, open to investigation and discussion. The forests, with the accumulation of vegetation upon the ground, serve to break the force of the rain and regulate the run-off; excessive soil erosion is to a large extent prevented, and the waters drained from the forests are, as a rule, free from suspended mineral matter.

The Government has set about the protection of the forests upon the headwater streams of the West, and Congress has under consideration legislation tending to promote the construction of large reservoirs within or adjacent to the forest reserves. Here are to be found, at the headwaters of the streams, many valleys whose outlets can be closed by a dam of moderate height, holding back the water from melting snow, or from occasional storms. These natural reservoir sites are being surveyed and their capacity and cost ascertained.



PLACING LOGS IN WATER FOR RAFTS.

The amount of water available by storage is also being measured and the facts recorded, so as to make it possible to know definitely the benefits to be derived from the construction of these hydraulic works.

One of the sources of anxiety and uncertainty in regard to these reservoirs is the matter of silt and sediment. The flood waters roll along sand, gravel, and even boulders, depositing them wherever the current is checked. These floods, entering the artificial reservoirs, are brought to a halt and quickly lay down their load, forming a coating or layer of mud in the reservoir, tending to greatly diminish the storage capacity. If the water comes from forested slopes, where the soil is protected and held by roots, the amount of sediment may be negligible; but if, on the other hand, these forests are cut away, the underbrush and humus burned, the driving storms soon attack and move the loose earth and disintegrated rock, starting it on its journey down the slopes, to be finally caught in the reservoir below. Thus it happens that it is of first importance for the prolonged life of the reservoir that every care should be taken to perpetuate the forest cover upon the catchment area, wherever this can assist in holding the soil.

Trees.

By their influence on the atmosphere and the shade they afford, they purify and regulate the condition of the air.

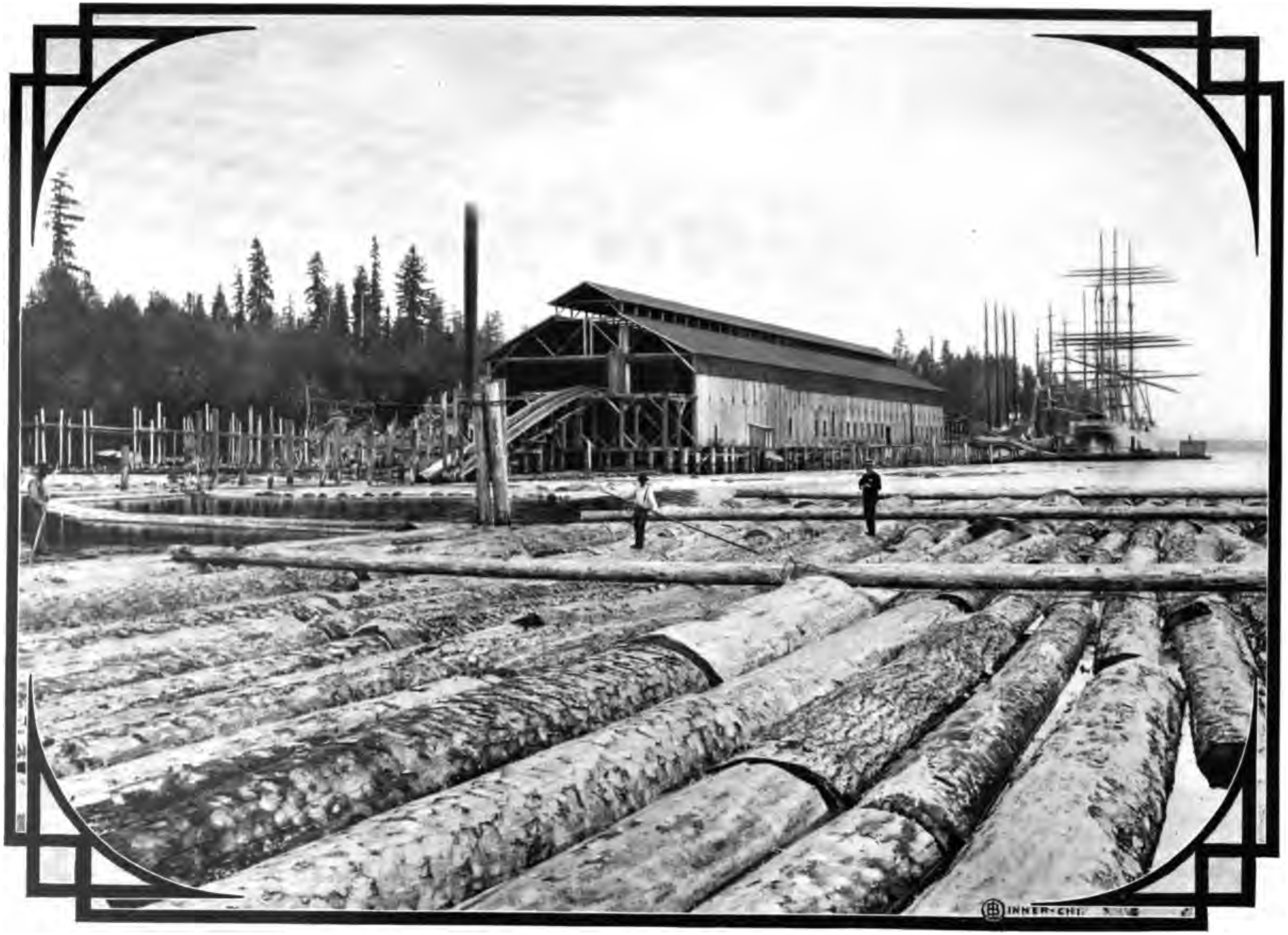
Trees are the most highly developed form of vegetable life. The leaves of trees, by a natural process of their own, absorb carbonic gas, which would be destructive to life if inhaled, and in return give out oxygen, the life and sustaining element of respirable air. The oxygen of the whole atmosphere would, in the course of time, be consumed by the breathing of animals, were it not for the singular provision which enables the leaves of trees to supply oxygen and keep up the proportion which is necessary for the support of animal life; and the gases which the trees absorb from the atmosphere are usually considered plant food, and also contribute to their growth. They also purify the atmosphere, counteracting the effects of animal life and various processes of decomposition. They also, by their transpiration, impart a degree of humidity to the air which surrounds them. They protect the ground from the direct rays of the sun, evaporate fluids elaborated by themselves, and cool the air in contact with them, by radiating the heat from their leaves. The leaves of deciduous trees are of such a nature that they perform, more quickly than the same organs of evergreens, the functions of scavengers, and take into their system for purification the obnoxious gases hovering about our dwellings. Another important feature is: that owing to the deciduous trees casting their leaves every year, the new ones come out fresh and full of vigour each spring, thus adding a degree of pleasure to the scene which is not always secured from trees of an evergreen character.

TABLE.

By Edward Mohun, C.E.

Shewing the weights, specific gravities, deflections, breaking and crushing loads of some of the British Columbia Woods. The pieces tested for transverse strength were one inch square, with a span of one foot, supported at both ends and loaded at the centre. The pieces tested for crushing were rectangular, and twice as long as they were thick. All the pieces were fair average specimens of timber, partly seasoned, but free from knots and flaws. The results obtained from exceptionally good or bad specimens are not included in this table.

Description of Timber.	Weight of a cubic foot in lbs.	Specific gravity.	Mean Deflection in Inches.										Highest Breaking Load.	Lowest Breaking Load.	Mean Breaking Load.	Mean Crushing Load, in lbs. per sq. inch.	
			200 lbs.	250 lbs.	300 lbs.	350 lbs.	400 lbs.	450 lbs.	500 lbs.	550 lbs.	600 lbs.	650 lbs.	lbs.	lbs.	lbs.	Endwise.	Sidewise.
Alder (*Alnus Rubra*—Bongard)	32.16	.5158	.092	......	.117	......	.158	.2	.25	......	......	......	600	530	567	6500	1500
Arbutus (*Arbutus Menziesii*—Pursh)	53.29	.8547	......	......	......	......	......	......	......	......	......	......	......	......	......	5900	1600
Birch (*Betula papyrifera*—Marsh)	37.57	.6025	.05	.087	.1	.117	.142	....	.2	.225	.25	....	660	630	650	7000	1750
Cedar (*Thuya gigantea*—Nutt)	24.95	.4001	.1	.133	.158	.2	.25	......	......	.....	.....	......	460	450	453	5500	1500
Crab Apple (*Pirus rivularis*—Dougl.)	50.21	.8052	......	.....	......	......	......	......	......	.....	......	......	......	......	......	......	......
Cypress, Yellow (*Chamæcyparis Nutkaensis*—Spach)	31.21	.5005	.05	......	.082	.117	......	.15	.2	......	.25	.31	700	680	693	5900	1400
Fir, Red (*Pseudotsuga Douglasii*—Carriere)	34.	.5453	......	.075	.09	.114	.119	......	.181	.21	.25	......	650	600	638	7000	1750
Hemlock (*Tsuga Mertensiana*—Carriere)	31.41	.5037	.09	.1	.14	.18	.....	.....	......	......	......	......	420	380	400	5000	1000
Maple (*Acer macrophyllum*—Pursh)	37.41	.5999	.063	......	.113	.15	.2	....	.27	......	......	......	610	550	580	7000	1500
Oak (*Quercus Garryana*—Dougl.)	51.73	.8296	.06	.16	.229	.312	.344	.354	.458	......	...	.....	550	550	550	6500	2500
Pine, White (*Pinus Monticola*—Dougl.)	27.79	.4457	.1	.125	.15	.2	.25	.....	......	......	......	....	500	450	473	5500	1000
Spruce (*Picea Sitchensis*—Carriere)	25.88	.415	.1	......	.15	.2	.3	...	.....	......	......	......	440	420	427	5000	1000
White Thorn (*Cratægus Douglasii*—Lindl.)	51.04	.8185	......	......	......	......	......	.....	.....	......	......	.....	... ...	......	......	5300	1600
Yew (*Taxus brevifolia*—Nutt)	49.05	.7865	.... .	......	......	......	......	......	......	.....	......	......	......	......	......	5900	2400



SAW-MILL, CHEMAINUS.

DOUGLAS FIR (*Pseudotsuga Douglasii*).

ULTIMATE BREAKING STRESSES IN POUNDS PER SQUARE INCH FROM EXPERIMENTS BY VARIOUS AUTHORS.

COMPILED BY E. MOHUN, C. E., 31ST OCTOBER, 1898.
REVISED " " " MAY, 1900.

AUTHOR.	REMARKS.	TENSION WITH GRAIN.	CRUSHING,		EXTREME SKIN STRESS.		MODULUS OF ELASTICITY.		SHEARING WITH GRAIN.		WEIGHT PER CUBIC FOOT.	BREAKING LOAD OF BEAM, 1 IN. SQUARE, 1 FT. SPAN, LOADED AT CENTRE.	
			Endwise	Sidewise	Limits.	Mean.	Limits.	Mean.	Limits.	Mean		Limits.	Mean.
(*a*.) Prof. Bovey	Specially selected	14,311			8,020 to 10,444	9,054	1,934,500 to 2,178,100	2,036,529	397 to 440	411	41.	445 to 580	503
	New timber, first quality	11,160	5,974		4,027 to 8,382	6,084	926,500 to 1,138,900	1,431,209	290 to 456	396	35.	224 to 466	338
	Old timber, old Canadian Pacific Railway stringers included in preceding	12,663	6,265		4,613 to 7,339	6,293	949,720 to 1,201,620	1,423,962	302 to 371	328	35.	256 to 408	350
	46 pieces, new timber, straight grained and clear		7,098										
	20 pieces, old timber, straight grained and clear		7,070										
(*b*.) Oregon & Cal. Ry		16,600	3,085	1,000		8,658							481
(*b*) J. D. Isaacs	Southern Pacific Railway	15,900	6,000					1,272,000		600			
(*b*.) Report of Am.	Chapter, Am. Ins. Architects					5,979							332
(*b*.) Chas. Wing	Ordinary No. 1 timber, 10 beams				5,580 to 7,951	6,482						310 to 442	360
	10 small beams				6,438 to 12,056	9,257						353 to 670	514
(*b*.) Onward Bates	10 beams				5,268 to 7,544	6,214						293 to 419	345
(*b*.) A. L. Johnson			4,400	500		6,600		1,380,000					367
(*c*.) E. Mohun	Specially selected, straight grained, free from knots and flaws, partly seasoned. All test pieces 1 inch square		7,000	1,750	10,800 to 11,700	11,484		1,585,000			34.	600 to 650	638
(*d*.) Prof. F. Soule	63 pieces	14,388											
	59 "		5,556										
	Indentation 3 per cent., 83 "			879									
	" 15 " 83 "			1,215									
	21 "					9,334		1,862,947			36.99		518
	85 "									546			
E. A. Wilmot	Old bridge stringer, damaged, 10″x12″x 37′ 6″					8,298							461
	MEAN	14,170	5,824	1,083		7,811		1,570,235		456	36.50		434

CLIMATIC STATISTICS, BRITISH COLUMBIA, 1900.

[* signifies snow and R rain, but the quantity was too small for measurement.]

METEOROLOGICAL STATIONS in British Columbia reporting during the year 1900, with their latitude, longitude, and height above sea level, when known.

Station.	Latitude N.	Longitude W.	Height.	Class.	Observer.
	° ′	° ′	Feet.		
Victoria	48 24	123 19	85	C. S.	E. Baynes Reed.
New Westminster	49 13	122 54	330	I.	Hugh Wilson.
Agassiz Experimental Farm	49 14	121 31	52	II. S.	T A. Sharpe.
Barkerville	53 2	121 35	4180	I.	James Stone.
Port Simpson	54 34	130 26	26	I.	Miss M. W. O'Neill.
French Creek	49 20	124 36	....	II.	W. H Lee, B.A.
Kuper Island	48 58	123 38	....	I. S.	Rev. R. J. Roberts.
Rivers Inlet	51 39	127 19	20	I.	S. Grant.
Hazelmere	49 3	122 43	....	II.	H. T. Thrift.
N. Nicomin	49 12	122 2	59	II.	J. F. Harris.
Matsqui Prairie	49 7	122 16	....	II.	W. S. Maher.
Kamloops	50 41	120 29	1193	I.	C. S. Stevens.
Midway	49 0	118 46	1800	II.	R. Gardom.
Carmanah	48 38	124 47	130	I.	W. P. Daykin.
Chilliwack	49 10	121 57	21	I.	Mrs. W. H. DeWolf.
Ladner	49 5	123 4	....	II.	A. DeR Taylor.
Rossland	49 6	117 40	3400	I.	Alfred W. Dyer.
Bella Coola	52 20	126 54	150	II.	H B. Christensen.
Tobacco Plains	49 1	115 5	2300	II.	Michael Phillipps.
Nicola Lake	50 9	120 39	2120	II.	Edwin Dalley.
Griffin Lake	50 56	118 29	1517	II.	W. T. Broderick.
Reclamation Farm, West Kootenay	49 20	117 50	....	II.	Wm. Henderson.
Nelson	49 29	117 21	....	II.	C. St. Barbe.
Quesnel	52 59	122 30	1700	II.	Mrs. J. A. Bowron.
Bullion	52 45	121 55	....	II.	A. Oakley.
Chilcotin	52 2	122 40	217	II.	M. G. Drummond.
Okanagan Mission	49 52	119 29	....	II.	T. E. R. Wollaston.
Pilot Bay	49 39	116 55	....	II.	W. Riddell.
Port Bobs (Quatsino)	50 32	128 3	....	II.	B. A. Leeson.
Masset	53 58	132 9	10	II.	C. Harrison.
Alberni	49 20	124 51	300	II.	Stanley R. S. Bayne.
Enderby	50 32	119 7	1180	II.	Rev. G. R. Lawes.
Stuart Lake	54 28	124 12	1800	II.	A. C. McNab.
Vancouver	49 17	123 5	195	II.	F. T. Underhill, M.D.
Garry Point	49 21	123 17	....	II.	Wm. McColl.
Cape Scott	52 20	126 54	....	II.	N. C. Nelson.
Revelstoke	51 0	118 6	1476	II.	Miss McKechnie.
Coldstream Ranch	50 14	119 15	1246	II.	W. C. Ricardo.
Clayoquot	49 11	125 47	....	II.	P. Maurus.
Naas Harbour	54 56	129 56	....	III.	L. A. Chambers.
Cumberland	49 37	125 1	....	III.	J. W. Bailey, M.D.
Port Essington	54 9	129 55	....	III.	Rev. D. Jennings.
Langley	49 5	122 32	....	III.	G. Simpson.
Royal Oak (Victoria)	48 24	123 19	....	III.	D. Lehman.
Caulfield's (Point Atkinson)	49 21	123 16	....	III.	A. C. E. Caulfield.
Goldstream Lake	48 27	123 33	....	III.	G R. Crook.
Nanaimo	49 10	123 57	....	III.	Marshal Bray.
Vancouver	49 17	123 5	....	III.	J. T. Brown.

CHIEF STATION.—Observations registered continuously day and night.

FIRST CLASS.—Observations of pressure, temperature, extremes, rain, snow and weather, three times daily.

SECOND CLASS.—Observations of temperature, extremes, rain, snow and weather, daily.

THIRD CLASS.—Observations of rain, snow and weather, daily.

SUNSHINE.—Stations at which the duration of bright sunshine is registered daily.

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TABLE I.—Temperature for each of the six months constituting the growing period (April to September, inclusive) at fourteen stations in British Columbia, together with the average for the whole group of years to 1899.

	Victoria.	Barkerville.	Agassiz.	French Creek.	Hazelmere.	Kamloops.	N. Nicomin.	Quesnel.	Rivers Inlet.	Tobacco Plains.	W. Kootenay.	Griffin Lake.	Pilot Bay.	Nicola Lake.
APRIL.	o	o	o	o	o	o	o	o	o	o	o	o	o	o
1900	50.8	40.4	54.9	47.6	51.1	51.3	51.0	44.8	45.6	48.0	50.7	54.4	48.6	46.5
1899	47.0	31.8	45.1	44.8	48.5	46.8	47.7	40.4	42.7	41.7	43.6	44.3	43.6	42.0
Average to 1899	47.1	34.3	46.4	46.4	47.3	48.8	48.0	41.6	43.2	45.7	47.9	45.2	45.4	44.3
MAY.														
1900	53.6	46.3	54.4	51.2	55.2	57.2	54.8	52.7	49.5	53.1	56.9	57.5	55.4	52.0
1899	50.0	38.6	52.2	49.4	51.1	53.6	51.5	47.6	48.5	49.1	51.0	52.6	50.4	48.3
Average to 1899	53.0	45.1	54.1	51.5	53.7	59.1	54.8	49.7	50.0	54.4	55.8	55.1	52.6	51.4
JUNE.														
1900	57.9	53.0	57.0	56.6	59.4	63.8	60.2	56.4	56.4	62.2	64.5	64.4	63.0	59.1
1899	53.3	47.2	58.1	55.0	56.7	62.2	57.4	56.3	52.6	56.4	58.9	60.1	58.4	54.9
Average to 1899	57.0	50.7	57.1	57.6	57.8	63.6	59.1	57.4	54 1	59.7	62.0	59.4	60.3	57.3
JULY.														
1900	60.1	55.4	65.5	62.1	62.0	67.2	63.6	61.1	59.3	64.1	66.3	67.3	65.8	62.1
1899	61.8	56.2	64.8	62.4	61.6	69.1	64.6	63.4	61.8	63.6	67.4	66.6	67.8	63.0
Average to 1899	60.0	55.0	62.2	61.9	60.9	68.7	64.8	61.8	59.1	64.6	67 9	65.7	67.3	62.9
AUGUST.														
1900	59.3	50.7	60.2	59.2	60.4	62.8	61.0	57.5	58.5	56.7	59.7	59.5	61.9	56.9
1899	58.2	50.9	61.8	59.5	58.7	62.5	60.2	58.3	57.6	55.7	59.6	61.2	59.4	57.7
Average to 1899	59.4	56.3	63.9	62.6	61.7	68.8	64.7	60.7	59.6	62.0	64.2	66.4	65.2	61.9
SEPTEMBER.														
1900	55.8	46.2	55.5	55.0	56.8	57.1	57.7	52.1	54.8	53.2	55.0	53.7	57.7	51.5
1899	57.0	49.4	56.9	60.6	57.9	58.2	59.6	52.1	55.5	56.3	57.4	56.6	57.6	54.3
Average to 1899	54.5	47.1	55.9	55.1	55.4	58.0	57.3	50.8	53.5	54.2	55.6	53.0	55.9	53.0
AVERAGE FOR SIX MONTHS.														
1900	56.2	48.7	57.8	55.3	57.5	59.8	58.1	54.8	54.0	56.2	58.8	59.8	58.7	55.6
1899	54.9	45.7	56.5	55.3	56.8	58.7	56.8	53.0	53.1	54.5	56.3	56.9	56·2	53.4
Average to 1899	55.2	48.1	56.6	55.8	56.1	61.2	58.1	53.7	53.3	56.8	58.9	59.0	57.8	55.1

TABLE II.—Precipitation of rain and snow during the five winter months for twelve stations in British Columbia for the year 1899-1900, with the average for the whole group of years.

	Victoria.		Kamloops.		Barkerville.		Rivers Inlet.		Agassiz.		Kuper Island.		French Creek.		North Nicomen.		Fort Simpson.		Midway.		Matsqui Prairie.		Tobacco Plains.	
	Rain.	Snow.	Rain.	Snow.	Rain.	Snow.	Rain.	Snow.	Rain.	Snow.	Rain.	Snow.	Rain.	Snow.	Rain.	Snow.	Rain.	Snow.	Rain.	Snow.	Rain.	Snow.	Rain.	Snow.
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
NOVEMBER.																								
1899	6.43	0.0	0.86	0.0	0.82	12.4	12.80	0.0	11.44	0.0	13.82	0.0	11.19	0.0	16.93	0.0	9.32	0.0	2.20	*	13.74	0.0	1.30	*
1898	4.44	0.0	0.49	9.5	0.00	35.0	17.81	14.8	3.99	12.0	6.05	2.0	4.69	5.0	4.08	12.7	11.67	1.0	0.00	12.5	8.37	10.0	0.50	4.5
Average	5.09	1.4	0.43	7.9	0.81	28.4	12.85	8.8	7.59	6.6	6.96	5.9	5.37	5.9	11.47	6.0	10.34	2.2	0.72	7.9	8.27	3.4	1.21	5.3
DECEMBER.																								
1899	5.03	2.5	0.64	0.2	0.16	22.0	15.80	*	9.90	2.5	6.24	4.6	5.63	6.0	10.93	3.0	5.59	0.9	0.00	13.3	9.39	3.2	0.05	19.5
1898	3.61	5.0	0.02	1.0	0.00	13.0	20.14	*	4.39	4.0	2.94	11.7	3.01	21.0	7.25	3.1	14.71	2.3	0.00	12.5	3.91	10.2	0.09	4.5
Average	6.10	1.6	0.27	4.5	0.06	36.9	14.34	8.6	8.26	10.9	7.57	4.1	5.95	5.3	11.05	10.8	12.10	11.3	0.05	9.9	7.97	7.1	0.29	8.7
JANUARY.																								
1900	3.60	0.0	0.24	2.0	0.00	18.2	15.81	0.0	13.04	0.0	6.49	0.0	5.90	0.0	9.07	0.0	5.15	1.0	0.00	5.5	7.63	0.0	0.82	3.5
1899	3.74	12.6	0.48	8.0	0.09	17.0	17.05	13.0	6.50	2.0	5.75	15.8	4.17	12.5	9.58	4.0	14.56	1.3	R	23.8	7.50	0.0	0.47	8.0
Average	4.45	6.6	0.13	7.2	0.31	27.0	11.59	13.0	6.12	12.3	5.45	14.1	4.07	11.0	7.04	10.4	10.27	6.4	0.10	10.0	5.54	5.8	0.33	5.2
FEBRUARY.																								
1900	2.40	3.5	0.18	0.8	0.00	43.0	10.85	1.0	2.01	8.0	3.11	16.0	2.67	6.0	5.58	7.7	3.78	4.5	0.00	2.8	4.90	6.0	0.18	3.0
1899	3.97	13.9	0.10	9.5	0.09	40.0	15.18	22.5	5.06	28.0	2.96	11.6	1.58	11.5	6.68	14.5	10.50	20.3	0.00	11.2	5.51	11.0	0.00	11.2
Average	3.32	5.3	0.33	5.6	0.15	29.5	11.73	16.1	4.95	11.8	3.94	5.3	2.43	7.7	8.53	9.2	7.10	15.3	0.04	5.3	4.63	8.1	0.37	5.4
MARCH.																								
1900	3.63	0.0	0.17	1.0	0.16	6.0	11.13	2.0	6.19	0.0	8.62	0.0	5.03	0.0	7.62	0.0	4.97	8.5	0.51	0.0	7.04	0.0	1.69	4.0
1899	2.21	2.4	0.01	0.0	0.28	19.0	8.40	30.0	4.01	7.0	2.01	11.6	1.91	2.6	3.46	9.8	0.97	0.6	0.00	3.6	1.85	11.5	R	5.0
Average	2.53	1.2	0.39	1.2	0.06	20.3	6.48	21.9	4.88	5.2	3.37	6.0	2.91	2.3	5.48	7.3	4.26	6.5	0.73	2.1	4.80	3.7	0.75	6.0
TOTALS.																								
1900	21.09	6.0	2.09	4.0	1.14	101.6	66.39	3.0	42.58	10.5	38.28	20.6	30.42	12.0	50.13	10.7	23.81	14.9	2.71	21.6	42.70	9.2	4.04	30.0
1899	17.97	33.9	1.10	27.0	0.46	124.0	78.58	80.3	23.95	53.0	19.71	52.7	15.36	52.6	31.05	44.1	52.41	25.5	R	63.6	27.14	31.7	1.06	33.2
Average	21.49	16.1	1.55	26.4	1.39	142.1	56.99	68.4	31.80	46.8	27.29	35.4	20.73	32.2	43.57	43.7	44.07	41.7	1.71	35.2	31.21	28.1	2.95	30.6

TABLE III.—Comparison of the rainfall at fifteen principal stations in British Columbia in the months April to September, 1900, with the average derived from a group of years:—

	Victoria.	New Westminster.	Barkerville.	Agassiz.	French Creek.	Hazlemere.	Kamloops.	North Nicomen.	Quesnel.	Rivers Inlet.	Kuper Island.	Tobacco Plains.	Pilot Bay.	Nicola Lake.	Griffin Lake.
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in	in.	in.
APRIL.															
1900	0.87	4.48	0.76	3.40	1.63	3.71	0.18	4.85	0.82	9.88	1.60	1.28	3.37	0.51	5.40
Average to 1900	1.92	3.96	0.44	4.68	1.79	4.40	0.35	6.15	0.42	9.45	1.68	1.09	1.59	0.63	1.87
MAY.															
1900	1.04	4.02	2.84	7.60	3.37	3.75	1.79	6.93	0.67	9.73	2.55	2.57	7.34	0.69	4.81
Average to 1900	1.18	3.41	2.12	5.02	2.30	3.90	1.15	5.80	0.81	5.56	1.65	1.63	3.51	1.30	2.48
JUNE.															
1900	1.61	5.62	5.91	10.76	2.88	5.29	1.63	10.67	2.59	6.28	2.39	2.05	10.99	2.27	6.00
Average to 1900	1.15	3.43	3.31	4.29	1.61	3.16	1.40	5.57	1.72	4.70	1.67	2.80	4.41	1.41	2.58
JULY.															
1900	0.40	1.59	2.78	1.21	0.94	1.20	1.78	2.11	2.46	4.54	0.71	1.34	3.18	1.22	1.89
Average to 1900	0.44	1.10	3.04	1.98	0.88	0.83	1.60	2.18	1.67	3.49	0.60	2.08	1.58	0.59	2.31
AUGUST.															
1900	0.61	3.30	3.50	5.65	1.56	2.05	2.22	5.14	3.00	4.76	1.07	2.20	8.25	3.26	11.39
Average to 1900	0.60	1.48	2.62	2.10	0.94	1.21	0.86	1.98	1.67	4.11	0.86	2.04	3.21	0.60	2.62
SEPTEMBER.															
1900	1.15	2.04	2.00	2.77	1.14	2.15	0.56	3.88	1.45	3.29	1.48	1.23	0.90	1.27	2.81
Average to 1900	1.84	2.95	2.93	4.82	2.16	3.14	0.89	4.94	1.79	7.81	1.88	1.66	1.22	0.63	1.77
TOTALS.															
1900	5.68	21.05	22.79	31.39	11.52	18.15	8.16	33.58	10.99	38.48	9.80	10.67	34.03	9.22	32.30
Average to 1900	7.13	16.33	14.46	22.89	9.68	16.64	6.25	26.62	8.08	35.12	8.34	11.30	15.52	5.16	13.63

TABLE IV.—*Sunshine.* Number of hours the sun was above the horizon in latitude 48°, the number of hours registered in 1900, 1899; the number of days completely clouded, with the maximum daily amount during 1900, at Victoria, Kuper Island, and at the Experimental Farm, Agassiz, B. C.:—

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	hours	hours	hours	hours	hours	hours	hours	hours	hours	hours	hours	hours
Sun above horizon in latitude 48°	273.0	285.8	371.0	412.6	472.5	480.3	483.4	441.8	375.5	328.6	275.5	256.0
VICTORIA.												
Hours registered, 1900	65.5	69.4	149.2	211.5	189.2	190.9	299.9	227.1	203.1	102.9	92.3	29.9
" " 1899	42.4	60.4	141.7	188.0	164.4	223.7	327.1	186.8	233.7	101.8	36.9	33.0
Number of days completely clouded, 1900.	9	8	6	2	2	6	0	2	3	8	10	20
" " " " 1899.	16	11	3	4	4	1	1	1	1	12	12	15
KUPER ISLAND.												
Hours registered, 1900	71.3	72.4	132.9	196.2	165.2	180.7	301.7	207.9	197.5	116.1	88.4	34.2
" " 1899	30.4	75.3	153.7	......	......	.....	......	.....	204.2	96.9	37.7	41.6
Number of days completely clouded, 1900.	12	13	10	3	1	7	1	1	1	10	9	18
" " " " 1899.	15	10	5	.....	......	.....	.....	......	0	12	15	12
AGASSIZ EXPERIMENTAL FARM.												
Hours registered, 1900	55.8	61.7	101.8	138.9	145.8	171.3	237.0	135.5	140.0	73.7	81.2	47.3
" " 1899	23.0	46.6	85.6	85.3	87.7	139.0	232.0	96.6	167.7	65.3	25.9	26.5
Number of days completely clouded, 1900.	20	14	13	8	5	8	2	9	7	14	18	21
" " " " 1899.	23	19	10	10	14	7	7	15	6	17	21	24
MAXIMUM DAILY AMOUNT IN HOURS.												
Victoria, 1900	7.9	8.9	10.8	13.0	13.1	13.8	13.3	12.8	12.0	10.1	7.9	6.7
Kuper Island, "	7.4	8.7	10.3	12.7	13.0	13.9	14.0	13.4	11.5	10.2	8.1	6.8
Agassiz Experimental Farm, "	6.7	8.1	8.8	12.5	12.1	13.5	13.1	12.0	11.0	8.7	7.9	6.0

TABLE V.—Percentage of sky clouded at the principal stations in British Columbia, with the average derived from the whole group of years.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
VICTORIA.	%	%	%	%	%	%	%	%	%	%	%	%
1900	73	77	64	55	67	64	40	54	51	74	61	88
1899	83	78	63	61	72	57	32	59	40	77	91	87
Average	78	77	66	65	60	59	41	44	58	68	78	80
AGASSIZ.												
1900	25	29	25	22	40	35	12	26	17	20	24	34
1899	35	42	25	23	26	19	17	23	15	34	61	37
Average	47	47	41	40	39	40	25	21	31	41	49	48
KUPER ISLAND.												
1900	69	73	64	51	62	59	36	53	42	63	69	86
1899	83	72	54	......	......	......	......	......	39	72	89	80
Average	76	72	57	59	53	56	44	40	46	61	77	79
NEW WESTMINSTER.												
1900	75	77	66	57	66	62	39	63	50	81	59	78
1899	......	......	......	65	76	68	39	71	44	72	93	86
RIVERS INLET.												
1900	69	73	59	49	71	63	57	46	29	76	66	82
1899	76	82	64	74	63	72	36	45	53	66	82	75
Average	71	74	61	68	68	67	56	47	57	69	76	74
PORT SIMPSON.												
1900	74	91	56	82	88	69	79	64	58	78	68	92
1899	73	90	54	81	68	79	60	61	65	81	96	88
Average	74	71	62	72	60	68	67	56	66	74	69	78
BARKERVILLE.												
1900	63	70	63	55	76	67	61	69	58	85	75	72
1899	71	65	56	68	66	74	48	69	39	70	79	71
Average	67	68	60	61	77	70	54	69	46	78	77	67
CARMANAH.												
1900	64	62	64	41	58	......	49	56	45	67	63	72
1899	75	82	65	56	57	57	54	58	49	51	88	73
Average	63	68	56	53	53	54	49	53	59	60	67	68
KAMLOOPS.												
1900	55	59	47	54	60	60	49	67	44	66	62	74
1899	72	66	48	58	60	56	41	72	50	67	65	64
Average	69	69	51	56	58	56	48	50	46	58	65	70

TABLE VI.—Showing for each month of the year 1900 the highest, lowest, mean highest, mean lowest, and mean temperature at seventeen stations in British Columbia; also the annual mean for each station.

	Victoria.	Kamloops.	New Westminster.	Barkerville.	Kuper Island.	Rivers Inlet.	Port Simpson.	Rossland.	Agassiz.	French Creek.	Tobacco Plains.	North Nicomin.	Hazelmere.	Reclamation Works, Kootenay.	Matsqui Prairie.	Bullion.	Midway.
JANUARY.	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
Highest	52.2	50.7	52.2	40.0	55.5	59.0	56.0	46.9	62.0	53.0	56.0	55.0	56.0	45.0	52.0	47.0	39.0
Lowest	31.0	15.4	26.0	-6.0	24.3	29.2	26.0	7.6	27.0	25.0	4.0	27.0	22.0	14.0	23.5	-4.0	3.0
Mean highest	47.0	38.6	44.9	31.2	47.7	42.8	46.9	34.7	51.1	44.4	38.9	46.5	51.6	36.5	45.8	33.8	33.3
Mean lowest	39.6	29.0	35.9	15.7	34.8	34.6	34.1	22.5	35.4	33.4	24.9	35.3	33.0	25.4	33.1	19.7	19.9
Monthly mean	43.3	33.8	40.4	23.5	41.2	38.7	40.5	28.6	43.2	33.9	31.9	40.9	42.3	31.0	39.5	26.8	26.6
FEBRUARY.																	
Highest	52.7	53.3	52.5	39.0	54.0	49.0	49.0	49.3	58.0	56.0	51.1	55.0	54.0	48.0	55.0	47.0	48.0
Lowest	18.0	-10.1	14.0	-26.0	19.5	17.4	20.0	-9.5	9.0	14.0	-20.4	18.0	13.0	-5.0	13.0	-26.0	-19.0
Mean highest	45.2	34.7	42.8	27.8	46.8	41.0	43.1	32.6	44.8	43.0	30.9	48.8	48.6	35.2	41.6	31.4	33.2
Mean lowest	36.4	20.3	31.9	11.6	31.7	31.8	30.8	13.8	29.9	30.0	14.8	32.0	30.3	19.3	30.2	13.2	12.4
Monthly mean	40.8	27.5	37.4	19.7	39.3	36.4	36.9	23.2	37.3	36.5	22.9	37.9	39.5	27.3	35.9	22.3	22.8
MARCH.																	
Highest	67.0	64.0	71.8	62.0	65.9	65.3	59.0	66.2	77.0	65.0	62.1	72.0	74.0	63.0	72.5	56.0	69.0
Lowest	34.8	16.0	32.0	-8.0	29.9	27.8	21.0	18.4	29.0	29.0	3.0	32.1	29.0	17.0	30.0	-11.0	20.0
Mean highest	53.6	50.9	54.5	43.4	55.0	50.5	49.0	51.1	65.8	52.9	50.8	56.5	61.1	50.9	59.3	43.6	54.0
Mean lowest	43.1	33.5	39.0	19.3	37.2	37.1	34.2	47.4	39.3	35.4	28.0	39.5	36.7	30.8	37.6	21.4	28.4
Monthly mean	48.3	42.2	46.8	31.3	46.1	43.8	41.6	39.2	52.6	44.2	39.4	48.0	48.9	40.9	47.4	31.5	25.7
APRIL.																	
Highest	75.3	78.0	78.6	76.0	86.1	74.6	70.0	75.0	90.0	78.0	73.1	82.0	80.0	76.0	82.5	79.0	84.0
Lowest	35.2	27.0	29.0	10.0	29.9	27.4	31.0	21.9	30.0	28.0	26.0	30.0	28.0	31.0	28.5	16.0	25.0
Mean highest	58.0	62.3	59.4	52.7	60.7	54.4	54.2	62.7	70.9	59.3	61.9	61.7	64.0	63.0	61.1	57.4	64.1
Mean lowest	43.6	40.3	40.4	28.0	38.3	36.9	38.4	34.0	37.1	35.9	34.2	40.4	33.2	38.4	38.8	31.3	34.3
Monthly mean	50.8	51.3	49.9	40.4	49.5	45.8	46.3	48.4	54.0	47.6	48.0	51.0	51.1	50.7	49.9	44.4	49.2
MAY.																	
Highest	65.7	79.5	74.5	82.0	73.0	62.9	72.0	84.3	86.0	68.0	86.1	76.0	73.0	81.0	77.0	82.0	86.0
Lowest	42.0	37.3	38.0	22.0	36.6	37.5	34.0	30.4	38.0	34.0	30.0	38.0	35.0	40.0	38.0	31.0	......
Mean highest	59.6	68.0	62.4	60.1	64.7	55.8	57.0	66.0	67.3	60.1	66.4	63.8	66.2	68.1	64.0	62.7	70.1
Mean lowest	47.6	46.4	45.8	32.5	45.5	43.1	42.0	39.3	41.5	42.3	39.8	45.8	44.2	45.8	45.4	38.5	......
Monthly mean	53.6	57.2	54.1	46.3	55.1	49.4	49.5	52.7	54.4	51.2	53.1	54.8	55.2	56.9	54.7	50.6	......

TABLE VI.—*Concluded.*

	Victoria.	Kamloops.	New Westminster.	Barkerville.	Kuper Island.	Rivers Inlet.	Port Simpson.	Rossland.	Agassiz.	French Creek.	Tobacco Plains.	North Nicomin.	Hazelmere.	Reclamation Works, Kootenay.	Matsqui Prairie.	Bullion.	Midway.
JUNE.	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
Highest........	77.4	84·6	82.2	82.0	89.0	81 0	70.5	90.0	84.0	80.0	94.1	84.0	84.0	84.0	84.5	98.0	93.3
Lowest	45.3	44.1	40.8	28.0	39 8	42.0	37.5	34.0	40.0	30.0	33.0	41.0	37.0	47.0	40.0	31.0	31.0
Mean highest ..	64.6	73.5	60.2	66.6	70.7	62.6	61.9	74.0	69.3	66.5	76.7	69.7	71.0	74.5	70.1	70.4	79.8
Mean lowest....	51.2	54.0	50.1	39.3	49.1	48.1	45.2	46.4	43.6	46.8	47.7	50.8	47.7	54.5	50.3	44.8	43.7
Monthly mean .	57.9	63.8	59.6	53.0	59.9	55.4	53.6	60.2	57.0	56.6	62.2	60.2	59.3	64.5	60.2	57.6	61.7
JULY.																	
Highest........	79.6	93.4	81.5	86.0	95.0	80.3	72.5	96.4	90.0	83.0	97.1	83.0	84.0	87.0	83.0	90.0	100.5
Lowest	50.0	49.5	47.8	35.0	46.5	46.2	46.5	38.4	45.0	47.0	40.0	46.0	42.0	46.0	45.0	40.0	35.0
Mean highest ..	67.3	78.2	72.7	67.8	76.5	65.6	64.1	77.7	79.8	72.9	79.7	74.5	75.8	77.2	74.3	72.4	85.4
Mean lowest....	52.9	56.2	52.0	43.1	51.9	51.3	51.5	48.1	51.2	51.3	48.5	52.7	48.1	55.3	51.9	46.6	44.4
Monthly mean .	60.1	67.2	62.4	55.4	64.2	58.5	57.8	62.9	65.5	62.1	64.1	63.6	62.0	66.3	63.1	59.5	64.9
AUGUST.																	
Highest........	79.0	88.0	78.0	72 0	80.0	69.9	71.0	89.1	90.0	77.0	94.1	83.0	80.0	84.0	80.0	79.0	89.0
Lowest	44.1	41.5	39.0	26.0	39.0	41.8	40.0	32.7	41.0	37.0	31.0	39.0	32.0	42.0	37.0	31.0	30.0
Mean highest ..	66.3	71.7	68.7	60.9	70.5	64.7	63.8	71.1	75.2	71.0	72.8	70.2	72.9	69.9	69.2	66.9	76.7
Mean lowest....	52.4	53.0	51.2	40.4	50.3	50.1	49.5	45.8	45.3	48.4	40.6	51.9	47.9	49.5	50.7	42.6	44.9
Monthly mean .	59.3	62.3	60.0	50.7	60.4	57.4	56.7	58.5	60.2	59.2	56.7	61.0	60.4	59.7	59.9	54.7	60.8
SEPTEMBER.																	
Highest........	77.2	78.6	76.5	72.0	78.8	71.0	66.0	83.0	87.0	77.0	81.1	81.0	80.0	78.0	80.0	74.0	87.0
Lowest	39.0	31.5	34.0	22.0	34.9	36.3	36.0	29.5	34.0	32.0	22.0	36.0	30.0	29.0	33.0	24.0	28.0
Mean highest ..	62.9	67.9	65.8	58.1	66.9	63.1	61.4	66.9	73.3	66.5	66.7	67.9	71.7	66.2	66.9	62.0	70.8
Mean lowest....	48.6	46.3	46.3	34.4	46.6	47.1	45.7	42.3	43.7	43.6	39.7	46.3	41.9	43.7	45.5	37.3	39.1
Monthly mean .	55.8	57.1	56.1	46.2	56.8	55.1	53.6	54.6	58.5	55.0	53.2	57 1	56.8	55.0	56.2	49.6	55.0
OCTOBER.																	
Highest........	64.0	72.6	65.0	56.0	63.0	59.2	63.0	69.0	70.0	62.0	68.1	67.0	70.0	66.0	67.0	61.0	69.0
Lowest	38.2	28.0	33.5	14.0	31.8	33.1	29.0	24.5	34.0	30.0	18.0	36.0	26.0	25.0	33.0	19.0	21.0
Mean highest ..	55.1	57.4	54.7	41.4	56.1	50.3	58.7	40.6	64.3	55.8	52.7	56.7	63.8	53.5	57.3	47.4	57.0
Mean lowest....	45.2	39.6	42.9	27.4	41.7	41.0	37.5	33.7	39.1	38.4	34.3	42.5	40.5	35.7	41.3	32.4	33.3
Monthly mean .	50.1	48.5	48.8	34.4	48.9	45.7	45.6	41.7	51.7	47.1	43.6	49.6	52.2	44.1	49.3	39.9	45.2
NOVEMBER.																	
Highest........	57.0	56.6	56.5	50.0	55.8	55.5	57.0	54.1	65.0	58.0	49.0	58.0	60.0	52.0	57.0	50.0	52.0
Lowest	19.8	-5.6	12.0	-14.0	16.0	18.5	14.0	-2.6	12.0	15.0	-22.4	10.0	12.0	-8.0	10.0	-13.0	-22.0
Mean highest ..	48.6	38.3	45.4	29.5	48.0	43.7	45.3	37.7	44.9	46.3	34.4	47.0	51.7	36.6	46.7	34.3	36.6
Mean lowest....	38.5	24.7	32.6	16.1	33.6	34.7	33.3	22.9	30.6	32.1	19.1	32.6	30.4	21.8	31.0	20.0	17.6
Monthly mean .	43.5	31.5	39.0	22.8	40.8	30.2	39.3	30.3	37.8	39.2	26.7	39.8	41.0	29.2	38.9	27.2	27.1
DECEMBER.																	
Highest........	55.0	52.0	55.6	42.0	55.2	54.9	57.0	43.8	56.0	50.0	53.1	57.0	61.0	44.0	57.0	49.0	50.0
Lowest	31.2	16.0	20.0	0.0	26.8	25.0	26.0	3.0	27.0	28.0	-12.8	23.0	21.0	11.0	20.5	3.0	1.0
Mean highest ..	48.0	42.3	44.9	32.8	48.6	45.2	47.6	37.6	48.6	46.0	42.8	46.3	52.3	38.6	45.6	37.9	38.6
Mean lowest....	42.2	33.0	37.6	21.7	39.8	38.1	35.6	26.5	34.4	37.0	28.4	37.0	37.0	30.2	35.4	29.1	26.7
Monthly mean .	45.1	37.6	41.3	27.3	44.2	41.6	41.6	32.0	41.5	41.5	35.6	41.6	44.7	34.4	40.5	33.5	32.6
ANNUAL MEANS...	48.76	46.85	49.22	36.17	48.27	47.25	46.92	44.36	49.39	48.26	44.78	50.46	51.12	46.67	49.63	41.47	.....

TABLE VII.—Differences betwixt the average temperature for each month, each quarter, and for the year 1900, and the normals for each station derived from a group of years.

	Victoria.	Barkerville.	Kamloops.	New Westminster.	French Creek.	Kuper Island.	Rivers Inlet.	Port Simpson.	Agassiz.	North Nicomin.	Hazelmere.	Matsqui.	Tobacco Plains.
	o	o	o	o	o	o	o	o	o	o	o	o	o
January	5.8	5.2	9.4	3.6	3.7	4.0	4.6	7.7	9 2	6.0	4.5	6.2	5.9
February	1.7	0.8	1.4	-1.1	-1.5	-1.3	0.4	3.9	-1.6	0.2	-0.9	-0.1	-5.1
March	5.8	5.6	5.6	5.2	5.2	6.3	6.2	4.7	9.7	6.9	6.4	6.2	7.0
April	3.6	6 4	2.2	1.5	2.6	3.1	2.2	4.3	6.2	3.0	2.5	2.7	2.3
May	0.7	1.1	-0.4	1.4	-1.5	3.5	-0.5	1.6	-2.2	-0.3	1.8	0.1	0.4
June........................	1.2	2.4	0.0	-0.2	0.0	1.6	2.7	1.8	-2.2	1.1	0.7	1.6	2.5
July	-0.1	0.5	-1.2	-0.8	0.3	3.3	-0.1	2.8	1.7	-1.2	0.7	0.3	-0.5
August	-0.2	-5.6	-5.7	-3.6	-3.1	-2.5	-1 7	0.1	-5.9	-3.8	-0 4	-3 3	-6.2
September	0.9	-0.8	-0 7	-1.3	0.6	1 6	1.0	1 6	0.9	-0.1	0.9	2.4	0.1
October	0.4	-4.0	1 2	-1.3	0.1	0.5	-2 8	-1.6	0.5	-0.2	1 9	-0.3	0.2
November	-0.1	-1.0	-2.4	-1.1	-0.9	1.3	0.8	-1.4	-0 9	-2.3	-0.8	-4.1	-4.3
December	3.8	6.4	8.7	2.9	3.8	5.8	4.0	5.1	5.6	3.5	3.9	4.2	6.7
Winter........................	4.43	3.87	5 47	2.57	2.47	3.00	3.73	5.43	5.77	4.37	3.33	4.10	2.60
Spring	1 83	3.30	0.60	0 90	0.37	2.73	1.47	2.57	0.60	1.27	1.67	1.47	1.73
Summer	0.20	-1.97	-2.53	-1.90	-0.73	0.80	-0.27	1.50	-1.10	-1.70	0.40	-0.20	-2.20
Autumn	1.37	0 47	2.50	0.17	1.00	2.53	0.67	0.70	1.73	0.33	1.67	-0.07	0.89
Year........................	1.95	1 41	1.51	0.44	0.78	2.26	1.40	2.55	1.75	1.07	1.77	1.33	0.75

TABLE VIII.—Showing for each month the average of the highest, lowest, mean highest, mean lowest, and the mean temperature at the principal stations in British Columbia derived from the whole group of years, and the average annual at each station for the same period:—

	Victoria.	Barkerville.	Kamloops.	New Westminster.	French Creek.	Kuper Island.	Rivers Inlet.	Port Simpson.	Agassiz.	North Nicomin.	Hazlemere.	Enderby.	Tobacco Plains.
January.	o	o	o	o	o	o	o	o	o	o	o	o	o
Highest	57.9	40.4	47.8	52.0	50.5	53.1	46.7	54.0	50.9	51.6	55.5	43.6	48.3
Lowest	21.9	-20.3	-4.7	18.5	17.5	22.9	19.7	8.4	10.1	9.7	13.3	-11.1	-12.2
Mean highest	41.9	24.8	30.8	40.9	39.9	42.2	37.7	39.1	39.1	39.9	45.4	31.2	32.6
Mean lowest	33.1	11.8	17.9	32.7	30.5	32.2	30.5	26.5	28.8	30.0	30.2	17.4	19.3
Monthly mean	37.5	18.3	24.4	36.8	35.2	37.2	34.1	32.8	34.0	34.9	37.8	24.3	26.0
February.													
Highest	58.0	40.3	50.6	53.8	52.2	53.8	50.2	51.5	56.4	54.9	57.2	48.0	51.9
Lowest	22.4	-18.4	-2.4	21.7	21.5	26.2	20.5	10.1	17.0	17.3	19.0	3.4	-6.2
Mean highest	44.1	26.6	33.9	44.1	44.1	46.6	40 9	39.7	45.3	42.7	48.4	36.1	35.5
Mean lowest	34.1	11.2	18.3	32.8	31.9	34.6	31.1	26.3	32.5	32.6	32.4	17.8	20.5
Monthly mean	39.1	18.9	26.1	38.5	38.0	40.6	36.0	33.0	38.9	37.7	40.4	27.0	28.0
March.													
Highest	63.1	47.3	60.6	59.9	56.3	56.7	55.2	53.6	65.1	59.1	63.3	57.4	56.1
Lowest	26.4	-6.5	8.4	24.1	22.2	23.3	22.2	17.7	23.1	23.0	20.2	3.1	1.5
Mean highest	48.9	34.4	46.1	49.1	47.3	47.5	44.2	44.5	51.2	48.2	52.9	44.3	42.0
Mean lowest	36.1	16.9	27.0	34.2	30.7	32.0	31.0	29.8	34.6	33.9	32.1	21.9	22.7
Monthly mean	42.5	25.7	36.6	41.6	39.0	39.8	37.6	36.9	42.9	41.1	42.5	33.1	32.4
April.													
Highest	73.1	59.8	74.6	73.4	66.9	67.9	66.8	64.6	76.6	73.4	74.0	74.8	73.2
Lowest	31.5	9.2	27.8	29.8	27.2	28.6	29.6	25.4	31.2	31.4	27.2	22.8	16.2
Mean highest	54.9	43.9	60.5	57.4	54.2	55.4	50.8	49.8	57.6	56.8	60.3	60.3	57.9
Mean lowest	39.4	24.0	37.7	39.5	35.8	37.4	36.3	34.2	38.1	39.2	36.8	32.9	33.5
Monthly mean	47.2	34.0	49.1	48.4	45.0	46.4	43.6	42.0	47.8	48.0	48.6	46.6	45.7
May.													
Highest	81 9	74.3	84.1	79.5	77.1	79.1	77.8	70.4	85.8	83.6	80.0	86.2	83.6
Lowest	37.3	22.5	33.6	36.6	31.9	32.9	35.2	30.8	34.8	36.0	31.8	28.0	28.2
Mean highest	61.6	56.5	69.5	62.9	61.6	63.3	58.2	56.6	68.7	65.5	65.3	70.7	67.8
Mean lowest	44.2	33.9	45.7	42.6	41.6	39.9	41.5	39.2	44.5	44.7	41.6	39 4	37.6
Monthly mean	52.9	45.2	57.6	52.7	52.7	51.6	49.9	47.9	56.6	55.1	53.4	55.1	52.7
June.													
Highest	85.3	78.7	91.2	84.4	81.5	84.9	77.5	69.1	87.1	85.0	83.2	90.0	91.7
Lowest	41.9	31.2	41.5	41.9	37.5	38.2	38.8	37.4	39.1	40.9	35.0	34.4	32.9
Mean highest	65.5	62.6	76.1	69.2	66.6	68.5	61.1	60.0	70.6	68.8	70.6	74.8	74.0
Mean lowest	47.8	38.7	51.5	50.3	46.6	48.1	44.3	43.6	47.7	49.4	46.6	46.8	45.5
Monthly mean	56.7	50.6	63.8	59.8	56.6	58.3	52.7	51.8	59.2	59.1	58.6	60.8	59.7
July.													
Highest	88.4	83.0	97.3	89.7	87.0	88.2	83.5	74.3	92.1	88.4	87.7	91.0	95.7
Lowest	44.7	33.7	47.6	46.9	43.0	43.4	44.9	39.0	42.5	45.4	38.3	38.0	39.0
Mean highest	70.9	68.0	81.5	74.4	73.9	73.8	66.2	62.9	76.9	76.7	75.6	80.8	80.4
Mean lowest	49.6	41.9	55.4	52.0	49.7	47.9	51.0	48.1	50.6	52.9	46.9	49.8	48.8
Monthly mean	60.2	54.9	68.4	63.2	61.8	60.9	58.6	55.0	63.8	64.8	61.3	65.3	64.6
August.													
Highest	78.8	83.7	93.3	86.2	87.1	87.8	81.4	76.6	92.6	86.3	85.7	91.7	92.4
Lowest	45.0	33.1	45.6	45.8	42.2	45.0	43.2	40.2	44.0	45.1	36.7	38.8	35.4
Mean highest	69.2	70.3	81.3	73.6	74.2	75.5	66.7	64.1	81.5	76.1	74.7	81.4	79.1
Mean lowest	49.8	42.2	54.8	53.5	50.3	50.4	51.5	49.1	50.8	53.4	46.9	48.4	46.8
Monthly mean	59.5	56.3	68.0	63.6	62.3	62.9	59.1	56.6	66.1	64.8	60.8	64.9	62.9
September.													
Highest	72.4	75.8	83.6	79.2	75.8	77.4	71.4	68.0	86.4	80.7	79.7	76.2	83.5
Lowest	38.9	23.4	34.8	39.4	33.7	35.7	39.7	36.6	37.3	39.9	31.7	27.4	31.1
Mean highest	63.8	58.9	69.6	66.4	64.4	65.1	60.5	59.0	69.5	66.3	69.2	68.9	68.4
Mean lowest	46.1	35.3	46.1	48.4	44.4	45.3	47.6	44.9	45.7	48.2	42.6	38.2	37.7
Monthly mean	54.9	47.1	57.8	57.4	54.4	55.2	54.1	52.0	57.0	57.2	55.9	53.6	53.1
October.													
Highest	64.3	63.2	70.3	67.4	64.5	65.2	63.0	62.9	72.8	67.8	71.7	68.3	70.0
Lowest	33.8	15.6	25.8	34.1	28.3	31.5	35.8	29.7	31.7	32.0	25.8	22.5	30.2
Mean highest	55.8	47.3	56.0	57.2	55.3	56.3	53.4	54.2	61.6	56.7	61.8	57.3	54.4
Mean lowest	43.7	29.5	38.7	42.9	38.7	40.5	43.5	40.3	40.9	42.9	38.8	31.4	32.4
Monthly mean	49.7	38.4	47.3	50.1	47.0	48.4	48.5	47.2	51.2	49.8	50.3	44.4	43.4
November.													
Highest	55.7	51.3	59.5	57.1	56.0	56.4	51.8	60.1	62.1	58.8	60.2	56.0	54.9
Lowest	29.6	-5.6	7.5	23.3	24.0	22.6	25.5	18.4	21.2	23.8	18.4	7.1	-7.5
Mean highest	48.3	31.9	39.8	45.0	45.3	46.1	41.9	48.7	44.5	46.8	50.0	39.2	38.1
Mean lowest	38.8	15.8	28.0	35.2	34.9	32.8	34.8	32.6	32.8	37.5	33.6	21.9	23.8
Monthly mean	43.6	23.8	33.9	40.1	40.1	39.5	38.4	40.7	38.7	42.1	41.8	30.6	31.0
December.													
Highest	53.4	41.3	51.1	54.9	52.0	53.8	51.9	55.1	48.5	53.3	57.5	38.3	53.3
Lowest	27.5	-15.6	1.7	22.8	23.2	24.9	24.9	14.8	18.9	20.2	18.7	1.0	-11.8
Mean highest	45.5	27.8	34.2	42.7	42.2	43.6	41.5	42.8	41.0	42.6	47.7	32.9	35.0
Mean lowest	37.0	14.0	23.6	34.0	33.3	33.1	33.6	30.2	30.8	33.6	33.9	20.9	22.7
Monthly mean	41.3	20.9	28.9	38.4	37.7	38.4	37.6	36.5	35.9	38.1	40.8	26.9	28.9
Annual Mean	48.76	36.17	46.83	49.22	47.48	48.27	45.85	44.37	49.39	49.39	49.35	44.38	44.03

TABLE IX.—Average temperature for each month, and for the year 1900, at all stations in British Columbia.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Year.
	o	o	o	o	o	o	o	o	o	o	o	o	o
Victoria	43.3	40.8	48.3	50.8	53.6	57.9	60.1	59.3	55.8	50.1	43.5	45.1	50.72
Kamloops	33.8	27.5	42.2	51.3	57.2	63.8	67.2	62.3	57.1	48.5	31.5	37.6	48.33
New Westminster	40.4	37.9	46.8	49.9	54.1	59.6	62.4	60.0	56.1	48.8	39.0	41.3	49.65
Barkerville	23.5	19.7	31.3	40.4	46.3	53.0	55.4	50.7	46.3	34.4	22.8	27 3	37.58
Kuper Island	41.2	39.3	46.1	49.5	55.1	59.9	64.2	60.4	56.8	48.9	40.8	44.2	50.53
Rivers Inlet	38.7	36.4	43.8	45.8	49.4	55.4	58.5	57.4	55.1	45.7	39.2	41.6	47.25
Port Simpson	40.5	36.9	41.6	46.3	49.5	53.6	57.8	56.7	53.6	45.6	39.3	41.6	46.92
Chilliwack	......	.....	51.0	52.2	56.7	61.5	......	......	......	......	......	......	......
Ladner	39.6	37.0	44.5	48.0	54.3	58.4	60.9	58.8	......	......	......	......	......
Carmanah	41.8	39.7	45.7	47.4	51.7	......	58.0	57.2	54 8	48.1	44.3	44.0	......
Rossland	28.6	23.2	39.2	48.4	52.7	60.2	62.9	58.5	54.6	41.7	30.3	32.0	44.36
Agassiz	43.2	37.3	52.6	54.0	54.4	57.0	65.5	60.2	58.5	51.7	37.8	41.5	51.14
French Creek	38.9	36.5	44.2	47.6	51.2	56.6	62.1	59.2	55.0	47.1	39.2	41.5	48.26
Bella Coola	32.9	31.2	39.4	43.9	52.5	59.8	64.2	60.0	55.4	......	......	......	......
Tobacco Plains	31.9	22.9	39.4	48.0	53.1	62.2	64.1	56.7	53.2	43.6	26.7	35.6	44.78
Nicola Lake	31.6	24.6	39.4	46.5	52.0	59.1	62.1	56.9	51.5	44.2	27.6	34.6	44.17
North Nicomin	40.9	37.9	48.0	51.0	54.8	60.2	63.6	61.0	57.1	49.6	39.8	41.6	50.46
Hazlemere	42.3	39.5	48.9	51.1	55.2	59.3	62.0	60.4	56.8	52.2	41.0	44.7	51.12
Griffin Lake	35.4	24.0	41.4	54.4	57.5	66.4	67.3	59.5	53.7	42.4	32.5	35.2	47.48
Reclamation Farm	31.0	27.3	40.9	50.7	56.9	64.5	66.8	59.7	55.0	44.1	29.2	34.4	46.67
Vancouver	40.8	37.3	45.7	49.2	54.3	59.0	62.0	60.3	56.6	49.0	39.5	42.7	49.62
Garry Point	40.3	37.5	44.7	48.1	53 5	57.5	61.0	58.6	53.3	47.7	38.1	41.5	48.48
Matsqui Prairie	39.5	35.9	47.4	49.9	54.7	60.2	63.1	59.9	56.2	49.3	38.9	40.5	49.63
Nelson	32.0	.....	......	.....	55.9	64.6	66.6	63.4	58.4	46.9	33.3	36.4	......
Quesnel	24.6	20.6	31.0	44.8	52 7	56.4	61.1	57.5	52.1	44 0	32.6	38.0	42.95
Bullion	26.8	22.3	31.6	44 4	50.6	57.6	59.5	54.7	49.6	39.9	27.2	33.5	41.47
Chilcotin	24.8	20.9	34.6	48.4	......	......	......	......	......	.....	......	......	......
Midway	26.6	22.8	25.7	49.2	......	61.7	64.9	60.8	55.0	45.2	27.1	32.6	.....
Okanagan Mission	32.7	27.2	41.3	49.0	56.4	63.6	65.8	61.8	55.2	45.7	.....	35.8	......
Pilot Bay	34.2	28.0	40.3	48.6	55.4	63.0	65.8	61.9	57.7	......	......	.....	......
Port Bobs	.....	......	43 7	44.3	49.6	54.9	59.2	57.4	54.6	47.2	40.6	44.1	......
Masset	39.2	38.9	41.4	42.1	48.7	54.3	57.8	57.4	54.4	......	40.3	45.3	......
Alberni	......	36.5	46.4	49.0	54.4	60.5	65.6	62.5	57.9	47.9	39.5	40.6	......
Enderby	29.6	24.6	39.8	48.7	55.1	62.2	65.7	59.4	53.8	45.3	......	......	......
Stuart Lake	11.0	5.5	12.7	32.2	39.9	46.3	51.3	47.4	41.9	31.0	19.5	22.9	30.13
Cape Scott	43.3	39.4	44.7	.....	......	......	......	.....	.....	......	.....	......	......
Revelstoke	30.2	22.9	36.4	47.1	54.2	......	.....	......	.....	......	......	.....	.....
Coldstream Ranch	......	......	......	48.9	54.8	61.8	65.7	60.6	55.8	45.6	28.1	32.5	......
Clayoquot	......	.....	.....	......	....	......	58.4	58.1	55.8	49.3	44.0	45.3	.....

TABLE X.—Highest temperature registered for each month, and for the year 1900, at all stations in British Columbia.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Year.
	o	o	o	o	o	o	o	o	o	o	o	o	o
Victoria	52.2	52.7	67.0	75.3	65.7	77.4	79.6	79.0	77.2	64.0	57.0	55.0	79.6
Kamloops	50.7	53.8	64.0	78.0	79.5	84.6	93.4	88.0	78.6	72.6	56.6	52.0	93.4
New Westminster	52.2	52.5	71.8	78.6	74.5	82.2	81.5	78.0	76.5	65.0	56.5	55.6	82.2
Barkerville	40.0	39.0	62.0	76.0	82.0	82.0	86.0	72.0	72.0	56.0	50.0	42.0	86.0
Kuper Island	55.5	54.0	65.9	86.1	73.0	89.0	95.0	80.0	78.8	63.0	55.8	55.2	95.0
Rivers Inlet	59.0	49.0	65.3	74.6	62.9	81.0	80.8	69.9	71.0	59.2	55.5	54.9	91.0
Port Simpson	56.0	49.0	59.0	70.0	72.0	70.5	72.5	71.0	66.0	63.0	57.0	57.0	72.5
Chilliwack	.....	......	75.1	89.5	80.1	88.1	......	......	......	......	......	.....	......
Ladner	54.0	51.0	59.0	63.0	68.0	79.0	76.0	......	......	......	.....	......	.....
Carmanah	53.0	50.0	61.0	67.0	68.0	......	70.0	66.0	69.0	57.0	55.0	54.0	.....
Rossland	46.9	49.3	66.2	75.0	84.3	90.0	96.4	89.1	83.0	69.0	54.1	43.8	96.4
Agassiz	62.0	58.0	77.0	90.0	86.0	84.0	90.0	90.0	87.0	70.0	65.0	56.0	90.0
French Creek	53.0	56.0	65.0	78.0	68.0	80.0	83.0	77.0	77.0	62.0	58.0	50.0	83.0
Bella Coola	47.0	42.0	62.0	82.0	78.0	91.0	92.0	85.0	81.0	......	.....	......	92.0
Tobacco Plains	56.0	51.1	62.1	73.1	86.1	94.1	97.1	94.1	81.1	68.1	49.0	53.1	97.1
Nicola Lake	50.0	50.0	60.0	75.5	81.5	83.5	89.0	85.5	76.5	67.5	52.0	50.0	89.0
North Nicomin	55.0	55.0	72.0	82.0	76.0	84.0	83.0	83.0	81.0	67.0	58.0	57.0	84.0
Hazlemere	56.0	54.0	74.0	80.0	73.0	84.0	84.0	80.0	80.0	70.0	60.0	61.0	84.0
Griffin Lake	46.0	40.0	62.0	95.0	96.0	108.0	110.0	88.0	87.0	68.0	55.0	51.0	110.0
Reclamation Farm	45.0	48.0	63.0	76.0	81.0	84.0	87.0	84.0	78.0	66.0	52.0	44.0	87.0
Vancouver	52.9	53.7	61.1	78.9	74.0	77.0	79.3	85.6	70.8	64.1	58.5	54.5	85.6
Garry Point	53.0	54.5	60.0	67.0	67.0	76.0	79.0	74.0	68.0	62.0	52.5	53.0	79.0
Matsqui Prairie	52.0	55.0	72.5	82.5	77.0	84.5	83.0	80.0	80.0	67.0	57.0	57.0	84.5
Nelson	49.0	.....	.....	......	81.0	91.0	94.0	94.0	86.0	68.0	50.0	49.0	94.0
Quesnel	50.0	49.0	60.0	82.0	85.0	86.0	90.0	82.0	78.0	62.0	59.0	65.0	90.0
Bullion	47.0	47.0	56.0	79.0	82.0	98.0	90.0	79.0	74.0	61.0	50.0	49.0	98.0
Chilcotin	55.0	51.0	64.0	87.0	...	...	......	......	.....	......	......	......	......
Midway	39.0	48.0	69.0	84.0	86.0	93.0	100.5	89.0	87.0	69.0	52.0	50.0	100.5
Okanagan Mission	53.4	53.8	62 1	79.7	86.9	90.0	96.0	94.1	79.1	68.7	......	51.8	96.0
Pilot Bay	46.0	47.0	55.0	70 0	72.0	85.0	89.0	87.0	75.0	......	......	......	89.0
Port Bobs	......	......	62.0	68.0	71.0	78.0	79.0	72.0	74.0	60.0	......	58.0	79.0
Masset	48.0	52.0	64.0	62.0	62.0	69.0	70.0	72.0	70.0	......	51.0	60.0	72.0
Alberni	......	49.1	65.1	84.2	78.1	89.2	91.2	81.1	83.1	79.1	56.1	52.1	91.2
Enderby	44.0	50.0	61.0	83.0	84.0	88.0	92.0	87.0	78.0	65.0	.....	......	92.0
Stuart Lake	44.0	33.9	45.0	64.0	65.0	77.5	81.0	70.0	68.0	54.0	43.0	43.0	81.0
Cape Scott	62.2	55.6	70.2	.....	......	......	.....	......	.....	......	......	......	......
Revelstoke	43.0	47.0	57.0	77.0	83.0	......	......	.....	......	......	.....	.....	......
Coldstream Ranch	......	.....	......	79.0	81.0	85.0	96.0	84.0	80.0	66.0	50.0	50.0	96.0
Clayoquot	......	......	......	......	......	......	78.0	73.0	76.0	65.0	61.0	53 5	78.0

TABLE XI.—Lowest temperature registered for each month, and for the year 1900, at all stations in British Columbia.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Year.
	°	°	°	°	°	°	°	°	°	°	°	°	°
Victoria	31.0	18.0	34.8	35.2	42.0	45.3	50.0	44.1	39.0	38.2	19.8	31.2	18.0
Kamloops	15.4	-10.1	16.0	27.0	37.3	44.1	49.6	41.5	31.5	28.0	-5.6	16.0	-10.1
New Westminster	26.0	14.0	32.0	29.0	38.0	40.8	47.8	39.0	34.0	33.5	12.0	28.0	12.0
Barkerville	-6.0	-26.0	-8.0	10.0	22.0	28.0	35.0	26 0	22.0	14.0	-14.0	0.0	-26.0
Kuper Island	24.3	19.5	29.9	29.9	36.6	39.8	46.5	39.0	34.9	31.8	16.0	26.8	16.0
Rivers Island	29.2	17.4	27.8	27.4	37.5	42.0	46.2	41.8	36.3	33.1	18.5	25.0	17.4
Port Simpson	26.0	20.0	21.0	31.0	34.0	37.5	46.5	40.0	36.0	29.0	14.0	26.0	14.0
Chilliwack	......	......	32.0	30.0	40.0	40.0	......	..	......	.. . .	......	......	......
Ladner	25.0	10.0	30.0	31.0	39.0	42.0	46.0	39.0	.....	......	......	......	......
Carmanah	.29 0	18.0	35.0	30.0	39.0	44.0	47.0	45.0	40.0	34.0	23.0	26.0	18.0
Rossland	7 6	-9.5	18.4	21.9	30.4	34.0	38.4	32.7	29.5	24.5	-2 6	3.0	-9.5
Agassiz	27.0	9.0	29.0	30.0	38.0	40.0	45.0	41.0	34.0	34.0	12.0	27.0	9.0
French Creek	25.0	14.0	29.0	28.0	34.0	39.0	47 0	37.0	32 0	30.0	15.0	28.0	14.0
Bella Coola	20.0	7.0	11.0	15.0	34.0	37.0	45.0	38.0	29.0	......	.....	.....	......
Tobacco Plains	4 0	-20.4	3.0	26.0	30.0	33.0	47.0	37.0	32.0	30.0	15.0	28 0	-20.4
Nicola Lake	11 5	-11.0	11.0	19.5	29.0	35 0	45.0	33.0	28 0	26.0	-18.5	14.5	-18 5
North Nicomin	27 0	13.0	32.0	30 0	38 0	41.0	46 0	39.0	36 0	36.0	10.0	23.0	10.0
Hazlemere	22 0	13 0	29.0	28.0	35.0	37.0	42 0	32.0	30.0	26.0	12.0	21 0	12.0
Griffin Lake	-15.0	-18.0	23.0	28.0	29 0	34.0	44.0	40.0	30.0	26.0	-10.0	2.0	-18.0
Reclamation Farm	14 0	-5 0	17.0	31.0	40.0	47.0	46.0	42 0	29.0	25 0	-8.0	11.0	-8.0
Vancouver	27.4	15.8	32.4	30 5	41.5	42.8	49 0	41.8	36 4	36.4	15 4	24.4	15.4
Garry Point	26 0	14.0	31.0	31.0	38.0	38.0	46.0	35 0	31.0	29.0	11.0	25.0	11.0
Matsqui Prairie	23 5	13.0	30.0	28.5	38 0	40.0	45.0	37 0	33.0	33.0	10.0	20.5	10.0
Nelson	11.0	.....	......	.....	36 0	41.0	46 0	39.0	33 0	33.0	2.0	8.0	2.0
Quesnel	-7 0	-22.0	-10.0	20.0	27.0	31.0	40.0	33.0	25.0	18.0	-9.0	10.0	-22.0
Bullion	-4.0	-26.0	-11.0	16.0	31.0	31.0	40.0	31.0	24.0	19.0	-13.0	3.0	-26.0
Chilcotin	2.0	-26.0	-9.0	25.0	......	......	......	.....	.....	.	......	......	-26.0
Midway	3.8	-19.0	20.0	25.0	....	31.0	35.0	30.0	28.0	21.0	-22.0	1.0	-22.0
Okanagan Mission	14.1	-13.7	18.3	23 2	29.6	36 6	43 5	40.8	28 2	28.1	.... .	12.0	-13.7
Pilot Bay	19.0	1.0	24.0	34.0	40.0	42.0	49.0	50.0	39 0	.....	......	......	.....
Port Bobs	.. ..	.. ..	30.0	30.0	39.0	40.0	46 0	44 0	40 0	31.5	......	30.0	......
Masset	29.0	27.0	30.0	28 0	36.0	41.0	47.0	44 0	34 0	......	24.0	30.0	......
Alberni	......	12.9	29.9	26.9	36.0	40.0	45.0	38.0	30.9	27.9	14 9	22.9	12.9
Enderby	8.0	-15.0	19.0	24.0	30.0	35.0	43.0	38.0	26 0	25.0	.....	......	......
Stuart Lake	-29.7	-38.6	-30 2	14.2	20.2	22.2	31 2	18.0	19.2	2.1	-27.4	-15.6	-38.6
Cape Scott	28.8	20.1	29.9	......	......	.... .	....	......	......	. ....	......	......	......
Revelstoke	7.0	-16.0	12.0	28.0	38.0	......	....	...	......	......	.....	......	......
Coldstream Ranch	......	......	......	25.0	34.0	37 0	43 0	38.0	28.0	26.0	-13.0	7.0	......
Clayoquot	......	.... .	......	......	......	......	43.0	43.0	36.0	32.0	23 0	26.0	......

TABLE XII.—Mean daily range of temperature for each month and for the year 1900 at all stations in British Columbia.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Year.
	°	°	°	°	°	°	°	°	°	°	°	°	°
Victoria	7.4	8.8	10.5	14.3	12.0	13.3	14.4	13.8	14.3	9.9	10.0	5.8	11.2
Kamloops	9.6	14.4	16.0	22.0	21.6	19.5	22.0	18.7	21.5	17.7	13.7	9.3	17.2
New Westminster	9.0	10.8	15.5	18.9	16.6	19.2	20.7	17.5	19.4	11.8	12.7	7.3	14.9
Barkerville	15.5	16.2	24.0	24.8	27.6	27.3	24.7	20.5	23.7	13.9	13.5	11.2	20.2
Kuper Island	12.9	15.2	17.8	22.4	19.2	21.6	24.6	20.2	20.3	14.4	14.4	8.8	17.6
Rivers Inlet	8.2	9.2	13.4	17.8	12.7	14.5	14.3	14.6	16.0	9.2	9.0	7.1	12.2
Port Simpson	12.8	12.3	14.8	15.8	15.0	16.7	12.5	14.4	15.7	16.3	12.0	12.0	14.2
Chilliwack	.....	.....	18.8	23.1	20.7	23.0	.....	.....	.....	.....	.....	.....	.....
Ladner	9.6	9.5	12.7	15.3	13.3	16.8	15.1	15.0	.....	.....	.....	.....	.....
Carmanah	10.2	10.8	11.9	14.5	12.7	.....	9.4	9.8	10.2	10.1	9.6	8.2	.....
Rossland	12.2	18.8	23.7	28.7	26.7	27.6	29.6	25.3	24.6	15.9	14.9	11.0	21.6
Agassiz	15.7	14.9	26.5	33.8	25.7	25.8	28.6	29.9	29.5	25.2	14.3	14.2	23.7
French Creek	11.1	13.0	17.5	23.4	17.8	19.7	21.6	22.6	22.9	17.4	14.2	9.0	17.5
Bella Coola	7.8	8.2	18.3	19.1	19.6	28.7	23.0	20.7	21.8	.....	.....	.....	.....
Tobacco Plains	14.0	16.1	22.8	27.7	26.6	29.0	31.2	32.2	27.0	18.6	15.4	14.4	22.9
Nicola Lake	13.7	18.5	20.4	24.4	24.3	21.7	28.3	19.3	23.0	18.2	16.8	11.0	19.6
North Nicomin	11.2	11.8	16.9	21.3	18.0	18.9	21.8	18.3	21.6	14.2	14.4	9.2	16.5
Hazelmere	18.5	18.8	24.4	25.8	22.0	28.1	27.7	25.0	29.8	22.3	21.3	15.3	23.2
Griffin Lake	7.1	8.2	13.4	23.4	24.8	32.6	35.7	28.4	24.5	18.3	15.4	12.6	20.4
Reclamation Farm	11.1	15.9	20.1	24.6	22.3	20.1	21.9	20.5	22.5	17.7	14.8	8.4	18.3
Vancouver	9.2	11.5	13.3	16.7	15.1	16.2	18.1	16.2	16.8	11.1	12.8	8.1	13.8
Garry Point	10.8	11.8	13.0	16.8	16.6	16.9	18.9	17.6	17.6	13.1	12.8	8.1	14.5
Matsqui Prairie	12.7	11.4	19.8	22.4	18.6	19.8	22.4	18.4	21.5	16.0	15.8	10.2	17.4
Nelson	8.4	.....	.....	.....	24.5	25.7	29.2	21.7	23.5	17.8	12.4	9.9	.....
Quesnel	16.6	22.9	30.1	30.5	33.6	30.4	29.8	26.3	30.7	25.7	25.4	26.4	27.4
Bullion	14.1	18.2	22.2	26.0	24.2	25.6	25.8	24.3	24.7	15.0	14.2	8.7	20.2
Chilcotin	14.8	19.7	24.1	31.0	.....	.....	.....	.....	.....	.....	.....	.....	.....
Midway	13.4	20.8	25.7	29.8	.....	36.1	41.0	31.8	31.7	23.8	19.0	11.8	.....
Okanagan Mission	12.1	15.7	20.4	26.1	28.6	28.2	30.9	24.7	25.8	21.2	.....	11.6	.....
Pilot Bay	6.9	10.1	13.7	19.1	20.6	18.8	20.8	17.5	17.4	.....	.....	.....	.....
Port Bobs	.....	.....	11.7	15.5	11.2	13.3	12.4	15.3	17.4	11.4	9.8	7.0	.....
Masset	12.3	11.5	16.1	15.1	18.9	16.9	16.6	20.2	20.8	.....	13.8	18.0	.....
Alberni	.....	11.1	15.6	22.4	19.7	22.5	26.3	24.2	23.8	14.8	10.4	6.8	.....
Enderby	11.7	19.3	22.9	28.4	29.2	27.0	30.2	25.8	27.6	20.1	.....	.....	.....
Stuart Lake	15.1	17.1	20.8	21.4	27.5	26.1	26.2	24.2	26.1	17.3	16.4	14.2	21.0
Cape Scott	10.2	10.1	14.8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Revelstoke	10.7	17.8	21.0	26.8	27.9	.....	.....	.....	.....	.....	.....	.....	.....
Coldstream Ranch	.....	.....	.....	23.6	23.0	22.2	28.5	23.4	23.2	17.4	14.1	9.1	.....
Clayoquot	.....	.....	.....	.....	.....	.....	20.2	17.8	11.2	13.0	14.7	10.1	.....

TABLE XIII.—Monthly and annual amount of rainfall in inches at the stations in British Columbia reporting during the year 1900, with the average for the stations derived from a group of years.

		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Year.
		in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
Victoria,	average	4.45	3.32	2.53	1.92	1.18	1.15	0.44	0.60	1.84	2.99	5.09	6.10	31.61
"	1900	3.60	2.40	3.63	0.87	1.04	1.61	0.40	0.61	1.15	2.68	2.33	4.07	24.29
New Westminster,	average	7.34	5.97	3.96	3.96	3.41	3.43	1.10	1.48	2.95	4.96	8.83	6.76	54.15
"	1900	6.47	4.50	9.44	4.48	4.02	5.62	1.59	3.30	2.04	8.82	7.75	9.19	67.22
Agassiz,	average	6.12	4.95	4.88	4.68	5.02	4.29	1.98	2.10	4.82	6.70	7.59	8.26	61.39
"	1900	13.04	3.01	6.19	3.40	7.60	10.76	1.21	5.65	2.77	5.13	3.39	7.05	69.20
Barkerville,	average	0.31	0.15	0.06	0.44	2.12	3.31	3.04	2.62	2.93	1.53	0.81	0.06	17.38
"	1900	0.00	0.00	0.16	0.72	2.84	5.91	2.78	8.30	1.90	2.70	0.14	0.00	25.45
Port Simpson,	average	10.27	7.10	4.26	6.96	4.89	4.54	5.75	5.76	8.66	11.79	10.34	12.10	92.42
"	1900	5.12	5.78	4.97	6.47	4.86	4.58	2.72	4.51	1.38	5.11	4.32	11.64	61.46
French Creek,	average	4.07	2.43	2.91	1.79	2.31	1.61	0.88	0.94	2.16	2.90	5.37	5.95	33.32
"	1900	5.90	2.67	5.08	1.63	3.37	2.88	0.94	1.56	1.14	4.94	3.22	8.04	41.32
Kuper Island,	average	5.45	3.94	3.87	1.68	1.65	1.67	0.60	0.86	1.88	3.43	6.96	7.57	39.06
"	1900	6.49	3.11	8.62	1.60	2.55	2.39	0.71	1.07	1.48	4.25	4.40	8.24	44.91
Rivers Inlet,	average	11.59	11.73	6.48	9.45	5.56	4.70	3.49	4.11	7.81	13.07	12.85	14.34	105 18
"	1900	15.81	10.85	11.13	9.88	9.73	6.28	4.54	4.76	3.29	19.61	6.69	13.86	116 43
Hazelmere,	average	6.12	4.79	3.05	4.40	3.90	3.16	0.83	1.21	3.14	3.95	7.24	6.85	48.64
"	1900	5.89	3.52	6.83	3.71	3.75	5.29	1.20	2.05	2.15	4.92	3.45	4.89	47.65
North Nicomin,	average	7.04	8.52	5.48	6.15	5.80	5.57	2.18	1.98	4.94	7.74	11.47	11.05	77.92
"	1900	9.07	5.58	7.62	4.85	6.93	10.67	2.11	5.14	3.88	8.76	5.38	11.57	81 56
Matsqui Prairie,	average	5.54	4.63	4.80	5.02	4.42	4.21	1.37	1.55	4.57	5.41	8.27	7.97	57.76
"	1900	7.63	4.90	7.04	4.92	7.11	8.22	2.20	2.36	2.65	7.65	4.83	8.31	67.82
Kamloops,	average	0.13	0.33	0.39	0.35	1.15	1.40	1.60	0.86	0.89	0.68	0.43	0.27	8.48
"	1900	0.24	0.18	0.17	0.18	1.79	1.63	1.78	2.22	0.56	0.64	0.23	0.56	10.18
Midway,	average	0.10	0.04	0.73	1.14	2.19	1.20	0.91	1.22	1.07	0.88	0.72	0.05	10.25
"	1900	0.00	0.00	0.51	0.82	1.96	0.81	0.46	1.09	1.52	1.82	0.21	1.15	10.35
Carmanah,	average	13.32	14.19	9.94	11.28	5.80	3.15	2.10	1.00	6.07	8.28	17.56	15.72	108.41
"	1900	12.80	10.74	8.41	8.11	6.15	11.38	2.05	2.36	1.42	14.56	11.22	23.66	112.86
Chilliwack,	"	.....	.....	6.36	4.31	6.26	8.29	.....	4.26	2.79	8.32	3.98	9.32	.....
Ladner,	"	6.76	3.90	6.58	3.15	2.64	3.15	0.00	1.78	.....	.....	.....	.....	.....
Rossland,	"	0.92	0.42	1.10	1.19	1.76	1.41	1.38	1.24	2.56	3.45	1.48	2.22	19.13
Bella Coola,	"	2.83	4.11	1.00	1.96	2.78	1.85	1.34	2.27	1.83	.....	.....	.....	.....
Tobacco Plains,	"	0.82	0.18	1.02	1.28	2.57	2.05	1.34	2.20	1.23	1.91	0.56	0.45	15.61
Nicola Lake,	"	0.12	0.10	0.36	0.51	0.69	2.27	1.22	3.26	1.27	1.63	0.45	0.55	12.43
Griffin Lake,	"	1.61	2.14	5.00	5.40	4.81	6.00	1.89	11.39	2.81	6.78	1.45	3.04	52.32
Reclamation Farm,	"	0.62	0.26	1.77	0.68	1.52	2.65	0.74	1.81	1.94	3.55	1.58	2.96	19.98
Nelson,	"	0.51	.....	.....	.....	2.36	3.00	1.44	2.31	1.48	4.11	1.78	3.64	.....
Quesnel,	"	0.00	0.25	1.46	0.82	0.67	2.59	2.46	3.00	1.45	0.62	1.06	0.00	14.36
Bullion,	"	0.30	0.00	0.25	0.83	2.23	3.90	1.83	6.07	1.85	1.64	0.89	0.78	20.57
Chilcotin,	"	0.15	0.00	0.29	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Okanagan Mission,	"	0.31	0.13	0.39	0.46	1.07	1.26	0.54	2.04	0.93	0.90	.....	0.82	.....
Pilot Bay,	"	7.95	1.25	4.08	3.37	7.34	10.99	3.18	8.25	0.90	.....	.....	.....	.....
Port Bobs,	"	.....	.....	12.22	6.68	10.00	6.20	2.23	3.59	2.84	18.04	8.48	13.94	.....
Masset,	"	3 55	1.30	1.30	2.35	7.70	3.15	5.25	3.25	0.80	.....	6.28	4.60	.....
Alberni,	"	10.73	3.60	9.78	2.82	4.96	4.95	1.54	1.52	1.68	11.20	8.06	19.70	80 54
Enderby,	"	0.43	0.04	0.40	0.51	1.68	2.51	2.21	2.90	2.06	2.19	.....	.....	.....
Stuart Lake,	"	0.50	0.70	0.31	0.80	1.41	1.37	1.55	0.68	0.50	0.12	0.90	0.70	9.04
Vancouver,	"	7.24	5.95	10.29	4.51	4.20	5.42	1.05	3.60	1.61	9.20	8.80	9.22	71.09
Garry Point,	"	5.12	3.20	6.79	3.25	2.43	3.68	1.01	2.38	1.46	4.23	5.74	6.41	45.70
Cape Scott,	"	16.49	10.67	10.70	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Revelstoke,	"	3.84	1.04	2.27	1.93	3.02	.....	.....	.....	.....	.....	.....	.....	.....
Coldstream Ranch,	"	.....	.....	.....	0.41	1.48	2.07	0.78	1.68	1.31	1.31	0.31	0.78	.....
Clayoquot,	"	.....	.....	.....	.....	.....	.....	.....	.....	3.22	25.95	13.01	22.66	.....
Naas Harbour,	"	.....	7.95	3.75	6.89	5.07	5.83	2.68	3.88	3.86	12.33	9.52	3.44	.....
Cumberland,	"	6.43	2.23	9.76	.....	.....	.....	.....	0.34	1.74	9.88	6.66	17.95	.....
Port Essington,	"	.....	.....	.....	9.00	6.87	9.29	4.04	7.29	4.87	16.40	15.39	17.38	.....
Langley,	"	6.83	4.43	8.89	4.03	4.98	7.86	1.65	2.82	2.15	.....	.....	.....	.....
Royal Oak,	"	5.04	2.75	5.41	1.40	1.45	2.78	0.62	0.36	1.45	4.48	3.05	5.46	34.25
Caulfield's,	"	3.74	5.28	9.95	4.37	4.71	5.23	.....	2.90	1.18	6.93	7.35	8.56	.....
Goldstream Lake,	"	10.70	5.22	12.01	3.05	2.64	4.44	1.27	1.24	2.03	8.96	7.71	12.97	72.24
Nanaimo,	"	7.66	3.63	7.07	1.66	3.73	3.12	0.80	0.64	1.03	4.39	6.15	11.41	51.29
Vancouver,	"	6.84	4.69	9.74	4.49	4.33	5.38	1.39	3.26	2.31	9.27	7.98	9.61	69.21

TABLE XIV.—Monthly and annual number of days of rainfall at the stations in Table XIII.

		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Year.
Victoria,	average	19	18	15	12	14	10	3	6	8	16	20	19	160
„	1900	21	18	15	9	18	16	3	6	10	18	12	4	150
New Westminster,	average	15	15	10	13	12	12	6	6	7	15	16	14	141
„	1900	22	16	13	10	18	16	8	12	8	20	13	21	177
Agassiz,	average	12	12	15	17	14	16	11	8	14	16	17	16	168
„	1900	20	11	9	11	22	20	12	13	12	15	12	13	170
Barkerville,	average	1	1	2	2	6	10	10	7	7	5	2	1	54
„	1900	0	0	1	5	12	17	15	17	7	10	2	0	86
Port Simpson,	average	19	12	13	18	15	15	15	13	17	22	19	19	197
„	1900	12	12	6	20	20	14	14	14	10	18	16	22	178
French Creek,	average	15	11	13	15	12	11	6	3	9	13	17	17	142
„	1900	19	12	11	6	15	11	4	5	5	18	10	19	135
Kuper Island,	average	18	19	13	12	11	11	6	4	8	15	20	20	157
„	1900	21	16	14	11	14	13	8	10	10	20	14	21	172
Rivers Inlet,	average	17	18	13	18	18	14	11	10	15	21	19	19	193
„	1900	21	19	19	17	25	13	11	14	7	24	15	23	208
Hazlemere,	average	16	16	13	15	16	13	4	6	10	16	17	21	163
„	1900	23	16	15	12	20	17	7	9	9	20	11	24	183
North Nicomin,	average	14	15	14	16	17	13	4	6	10	16	19	17	161
„	1900	22	17	12	12	18	18	5	12	9	20	12	23	180
Matsqui Prairie,	average	14	13	15	16	15	14	6	7	11	19	18	17	165
„	1900	19	13	14	12	20	15	4	18	8	21	12	20	176
Kamloops,	average	1	2	5	6	11	12	13	5	5	6	3	2	71
„	1900	4	2	2	3	10	6	7	13	3	3	3	8	64
Midway,	average	1	1	2	4	10	9	5	8	6	9	5	1	61
„	1900	0	0	3	3	10	10	5	11	9	16	5	11	83
Carmanah,	average	16	17	14	16	14	9	6	4	9	14	20	19	158
„	1900	24	17	15	9	9	8	6	5	7	22	17	23	162
Chilliwack,	„	....	....	12	13	19	19	....	12	9	13	7	10	....
Ladner,	„	12	10	12	9	16	8	0	5	....		....	....	....
Rossland,	„	5	2	5	7	8	12	9	13	10	8	6	6	91
Bella Coola,	„	6	8	4	7	16	6	9	9	4	....	....	....	....
Tobacco Plains,	„	6	3	6	7	7	9	5	8	6	8	7	6	78
Nicola Lake,	„	4	1	5	7	9	12	11	16	8	9	7	9	98
Griffin Lake,	„	4	4	11	11	24	19	6	18	7	12	6	11	133
Reclamation Farm,	„	5	3	8	5	12	12	6	11	10	18	7	9	106
Nelson,	„	4	....	....	....	12	14	10	14	9	17	10	18	....
Quesnel,	„	0	1	4	5	8	8	14	14	5	5	2	0	66
Bullion,	„	2	0	4	7	20	14	17	18	9	12	8	5	116
Chilcotin,	„	1	0	2	....	....	....	....	....	....	....	....	....	....
Okanagan Mission,	„	6	3	5	6	9	13	7	17	8	10	....	5	....
Pilot Bay,	„	9	2	5	3	5	8	4	5	5	....	....	....	....
Port Bobs,	„	....	....	21	14	19	14	9	6	5	25	14	22	....
Masset,	„	13	5	4	9	21	9	13	10	4	....	15	17	....
Alberni,	„	25	14	14	12	15	14	6	9	7	22	13	17	168
Enderby,	„	2	1	1	3	10	8	12	13	5	7	....	....	....
Stuart Lake,	„	1	5	2	2	8	5	4	2	1	1	1	1	33
Vancouver,	„	22	16	14	9	17	14	6	9	9	20	17	21	174
Garry Point,	„	17	15	14	10	17	11	6	10	8	16	11	21	156
Cape Scott,	„	23	22	22	....	....	....	....	....	....	....	....	....	....
Revelstoke,	„	9	3	8	6	14	....	....	....	....	....	....	....	....
Coldstream Ranch,	„	....	....	....	2	10	8	8	12	8	8	3	3	....
Clayoquot,	„	....	....	....	....	....	....	....	....	6	24	12	19	....
Naas Harbour,	„	....	10	9	18	20	15	13	13	11	20	12	11	....
Cumberland,	„	11	5	17	....	....	....	....	2	7	20	11	15	....
Port Essington,	„	....	....	....	19	24	19	15	11	13	25	16	27	....
Langley,	„	18	14	12	10	19	16	5	6	2	5	....	....	....
Royal Oak,	„	17	14	15	8	14	12	7	2	5	19	14	17	144
Caulfields,	„	12	20	15	10	21	15	....	10	8	22	11	21	....
Goldstream Lake,	„	22	16	17	11	17	17	5	8	8	21	12	23	177
Nanaimo,	„	16	8	10	6	13	9	4	3	4	13	12	9	107
Vancouver,	„	19	15	15	9	17	11	5	9	9	20	12	18	159

TABLE XV.—Monthly and annual amount of snowfall in inches, at the stations in British Columbia during the year 1900, with the average for the stations derived from a group of years.

		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Year.
Victoria,	average	6.6	5.3	1.2	....	....	....	....	....	....	*	1.4	1.6	16.1
"	1900	0.0	3.5	0.0	....	....	....	....	....	....	....	0.9	0.0	4.4
New Westminster,	average	5.1	6.8	3.5	0.2	....	....	....	....	....	....	8.6	2.5	26.7
"	1900	0.0	8.0	....	....	....	....	....	....	....	....	14.5	2.0	24.5
Agassiz,	average	12.3	11.8	5.2	0.2	....	....	....	....	....	....	6.6	10.9	47.0
"	1900	0.0	8.0	0.0	....	....	....	....	....	....	....	16.0	4.0	28.0
Barkerville,	average	27.0	29.5	20.3	14.8	2.8	0.2	....	*	1.4	9.8	28.4	36.9	171.1
"	1900	18.2	43.0	6.0	0.4	....	....	....	2.0	1.0	25.0	30.0	16.0	141.6
Port Simpson,	average	6.4	15.4	6.5	3.0	0.1	....	....	....	....	....	2.2	11.3	44.9
"	1900	1.0	4.5	8.5	*	....	....	....	....	....	....	4.5	2.3	20.8
French Creek,	average	11.0	7.7	2.3	0.1	....	....	....	....	....	....	5.9	5.3	32.3
"	1900	0.0	6.0	0.0	....	....	....	....	....	....	....	6.0	3.0	15.0
Kuper Island,	average	14.1	5.3	6.0	....	....	....	....	....	....	....	5.9	4.1	35.4
"	1900	0.0	16.0	0.0	....	....	....	....	....	....	....	11.0	0.0	27.0
Rivers Inlet,	average	13.0	16.1	21.9	6.2	1.7	....	....	....	....	0.1	8.8	8.6	76.4
"	1900	0.0	1.0	2.0	*	....	....	....	....	....	....	19.0	0.8	22.8
Hazlemere,	average	6.1	3.6	4.3	....	....	....	....	....	....	....	3.4	2.1	19.5
"	1900	0.0	7.0	0.0	....	....	....	....	....	....	....	0.5	0.0	7.5
North Nicomin,	average	10.4	9.2	7.8	....	....	....	....	....	....	....	6.0	10.8	43.7
"	1900	0.0	7.5	0.0	....	....	....	....	....	....	....	3.7	19.3	30.5
Matsqui Prairie,	average	5.8	8.1	3.7	....	....	....	....	....	....	....	3.4	7.1	28.1
"	1900	0.0	6.0	0.0	....	....	....	....	....	....	....	5.0	0.0	11.0
Kamloops,	average	7.2	5.6	1.2	....	....	....	....	....	....	....	7.9	4.5	26.4
"	1900	2.0	0.8	1.0	....	....	....	....	....	....	....	2.8	0.0	6.6
Midway,	average	10.0	5.3	2.1	....	....	....	....	....	....	....	7.3	9.9	34.6
"	1900	5.5	2.8	....	....	....	....	....	....	....	....	6.5	3.3	18.1
Carmanah,	average	6.6	7.1	2.3	0.4	0.1	....	....	....	....	....	2.7	2.4	21.6
"	1900	0.0	6.0	0.0	....	....	....	....	....	....	....	4.0	*	10.0
Chilliwack,	"	....	....	*	*	....	....	....	....	....	....	7.2	1.1	8.3*
Ladner,	"	....	....	....	....	....	....	....	....	....	....	....	....	....
Rossland,	"	31.0	36.9	23.1	5.2	....	....	....	....	....	26.4	3.3	37.7	163.6
Bella Coola,	"	4.8	14.0	28.0	....	....	....	....	....	....	....	....	....	....
Tobacco Plains,	"	3.5	3.0	4.0	....	....	....	....	....	....	*	11.5	2.3	24.3
Nicola Lake,	"	1.7	5.2	1.0	....	....	....	....	....	....	*	11.5	*	19.4
Griffin Lake,	"	2.1	65.8	8.0	....	....	....	....	....	....	....	36.0	11.3	123.2
Reclamation Farm,	"	15.0	12.0	2.0	....	....	....	....	....	....	....	10.5	6.5	46.0
Nelson,	"	6.5	....	....	....	....	....	....	....	....	....	14.0	10.5	....
Quesnel,	"	12.5	14.0	....	....	....	....	....	....	....	....	3.0	1.0	30.5
Bullion,	"	18.5	32.0	9.9	*	....	....	....	....	....	3.0	24.0	9.2	96.6
Chilcotin,	"	3.0	9.7	2.0	....	....	....	....	....	....	....	....	....	....
Okanagan Mission,	"	3.8	8.3	4.7	....	....	....	....	....	....	....	....	0.0	....
Pilot Bay,	"	6.2	17.8	7.0	....	....	....	....	....	....	....	....	....	....
Port Bobs,	"	....	....	0.0	1.0	....	....	....	....	....	4.5	2.0	0.0	....
Masset,	"	1.0	7.0	8.0	4.5	....	....	....	....	....	....	1.3	0.0	21.8
Alberni,	"	3.0	12.8	1.0	....	....	....	....	....	....	....	5.0	0.0	21.8
Enderby,	"	11.0	16.5	16.5	0.0	....	....	....	....	....	....	....	....	....
Stuart's Lake,	"	4.5	11.8	7.5	....	....	....	....	....	....	2.0	3.0	7.0	35.8
Vancouver,	"	0.0	6.0	0.0	0.0	....	....	....	....	....	....	12.2	0.0	18.2
Garry Point,	"	0.0	6.2	0.0	....	....	....	....	....	....	....	6.5	0.0	12.7
Cape Scott,	"	0.0	0.0	0.0	....	....	....	....	....	....	....	....	....	....
Revelstoke,	"	2.0	37.0	6.0	*	....	....	....	....	....	....	....	....	....
Coldstream Ranche,	"	....	....	....	....	....	....	....	....	....	....	8.2	0.0	....
Clayoquot,	"	....	....	....	....	....	....	....	....	....	0.0	5.0	0.0	....
Naas Harbour,	"	....	20.0	19.5	3.5	....	....	....	....	....	....	11.0	4.0	....
Cumberland,	"	3.5	10.0	1.5	....	....	....	....	....	....	....	7.5	0.0	22.5
Port Essington,	"	....	....	....	....	....	....	....	....	....	....	0.0	0.0	....
Langley,	"	0.0	8.0	0.0	....	....	....	....	....	....	....	....	....	....
Royal Oak,	"	0.0	5.7	0.0	....	....	....	....	....	....	....	6.0	0.5	12.2
Caulfields,	"	0.0	2.6	0.0	....	....	....	....	....	....	....	11.5	0.0	14.1
Goldstream Lake,	"	0.0	13.0	0.0	....	....	....	....	....	....	....	9.0	0.0	22.0
Nanaimo,	"	0.0	6.0	0.0	....	....	....	....	....	....	....	10.0	0.0	16.0
Vancouver,	"	0.0	5.5	0.0	....	....	....	....	....	....	....	12.7	2.0	20.2

TABLE XVI.—Monthly and annual number of days of snowfall at the stations in Table XV.

		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Year.
Victoria,	average....	3	2	2	....	....	....	....	....	....	1	2	1	11
"	1900..........	0	2	0	....	....	....	....	....	....	....	2	0	4
New Westminster,	average........	2	2	2	1	....	....	....	....	....	....	3	1	11
"	1900..........	0	3	0	....	....	....	....	....	....	....	3	1	7
Agassiz,	average	4	5	3	1	....	....	....	....	....	....	5	4	22
"	1900..........	0	4	0	....	....	....	....	....	....	....	5	2	11
Barkerville,	average	10	8	7	7	1	1	....	....	1	4	10	11	60
"	1900..........	6	4	3	2	....	....	....	1	1	10	8	8	43
Port Simpson,	average........	5	7	4	2	1	....	....	....	....	....	2	3	24
"	1900..........	2	3	2	1	....	....	....	....	....	....	3	2	13
French Creek,	average... ...	4	3	1	1	....	....	....	....	....	....	3	2	14
"	1900..........	0	3	0	....	....	....	....	....	....	....	3	2	8
Kuper Island,	average........	3	2	3	....	....	....	....	....	....	....	1	2	11
"	1900..........	0	4	0	....	....	....	....	....	....	....	2	0	6
Rivers Inlet,	average	4	5	6	3	....	....	....	....	....	....	3	5	26
"	1900..........	0	3	2	2	....	....	....	....	....	....	4	1	12
Hazlemere,	average........	4	2	2	....	....	....	....	....	....	....	2	2	12
"	1900..........	0	4	0	....	....	....	....	....	....	....	1	0	5
N. Nicomin,	average... ...	3	4	5	....	....	....	....	....	....	....	2	3	17
"	1900..	0	3	0	....	....	....	....	....	....	....	1	2	6
Matsqui Prairie,	average.... ...	3	5	3	1	....	....	....	....	....	....	2	1	16
"	1900..........	0	3	0	....	....	....	....	....	....	....	2	0	5
Kamloops,	average.... ...	6	6	6	....	....	....	....	....	....	1	4	6	29
"	1900......	1	2	1	....	....	....	....	....	....	....	4	0	8
Midway,	average........	9	5	4	....	....	....	....	....	....	....	3	5	26
"	1900..........	4	2	....	....	....	....	....	....	....	....	3	5	14
Carmanah,	average	4	4	4	1	1	....	....	....	....	....	2	2	18
"	1900..........	0	2	0	....	....	....	....	....	....	....	3	1	6
Chilliwack,	1900	....	....	1	1	....	....	....	....	....	....	2	1	....
Ladner,	"	0	0	0	....	....	....	....	....	....	....	....	....	....
Rossland,	"	13	15	7	1	....	....	....	....	....	9	15	14	74
Bella Coola,	"	2	2	3	....	....	....	....	....	....	....	....	....	....
Tobacco Plains,	"	3	5	3	....	....	....	....	....	....	*	3	2	16
Nicola Lake,	"	3	6	2	....	....	....	....	....	....	*	8	3	22
Griffin Lake,	"	7	14	3	....	....	....	....	....	....	....	6	6	36
Reclamation Farm,	"	9	10	3	....	....	....	....	....	....	....	5	3	30
Nelson,	"	4	....	....	....	....	....	....	....	....	....	5	3	....
Quesnel,	"	6	6	0	....	....	....	....	....	....	....	2	1	15
Bullion,	"	12	17	10	1	....	....	....	....	....	6	7	3	56
Chilcotin,	"	5	6	4	....	....	....	....	....	....	....	....	....	....
Okanagan Mission,	"	5	7	1	....	....	....	....	....	....	....	....	0	....
Pilot Bay,	"	5	5	2	....	....	....	....	....	....	....	....	....	....
Fort Bobs,	"	....	....	0	....	....	....	....	....	....	1	2	0	....
Masset,	"	2	2	2	2	....	....	....	....	....	....	1	0	9
Alberni,	"	3	5	1	....	....	....	....	....	....	....	3	0	12
Enderby,	"	8	8	8	....	....	....	....	....	....	....	....	....	....
Stuart Lake,	"	1	5	2	....	....	....	....	....	....	1	1	2	12
Vancouver,	"	0	3	0	....	....	....	....	....	....	....	2	0	5
Garry Point,	"	0	3	0	....	....	....	....	....	....	....	3	0	6
Cape Scott,	"	0	0	0	....	....	....	....	....	....	....	....	....	....
Revelstoke,	"	3	9	2	1	....	....	....	....	....	....	....	....	....
Coldstream Ranch,	"	0	....	....	....	....	....	....	....	....	....	3	0	....
Clayoquot,	"	....	....	....	....	....	....	....	....	....	....	3	0	....
Naas Harbour,	"	....	7	3	1	....	....	....	....	....	....	4	3	....
Cumberland,	"	1	4	2	....	....	....	....	....	....	....	1	0	8
Port Essington,	"	0	0	0	....	....	....	....	....	....	....	0	0	0
Langley,	"	0	3	0	....	....	....	....	....	....	....	....	....	....
Royal Oak,	"	0	3	0	....	....	....	....	....	....	....	2	1	6
Caulfield's,	"	0	2	0	....	....	....	....	....	....	....	2	0	4
Goldstream Lake,	"	0	3	0	....	....	....	....	....	....	....	4	0	7
Nanaimo,	"	0	3	0	....	....	....	....	....	....	....	3	0	6
Vancouver,	"	0	2	0	....	....	....	....	....	....	....	2	1	5

TABLE XVII.—Number of times the wind blew from each of the eight principal points at the chief station, Victoria, British Columbia, and the corresponding mileage derived from the registration at each hour of the day for the year 1900.

	N.		N. E.		E.		S. E.		S.		S. W.		W.		N. W.		Calm Hours.
	Hours.	Miles.	Hours.	Miles.	Hours.	Miles.	Hours.	Miles.	Hours.	Miles.	Hours.	Miles.	Hours.	Miles.	Hours.	Miles.	
January	194	1172	110	530	134	958	79	741	40	238	59	891	83	1319	19	118	26
February	227	1370	105	884	79	434	36	210	25	198	66	1190	86	1337	23	122	25
March	168	1112	83	532	144	1021	29	327	88	546	61	795	134	1268	8	36	29
April	119	726	64	359	43	213	18	128	98	827	78	895	225	2719	32	93	43
May	40	157	36	146	53	305	60	699	249	1963	96	991	148	1723	13	88	49
June	23	117	21	78	26	96	33	128	206	1166	129	1412	163	1694	28	138	91
July	10	59	3	27	7	29	17	95	160	1170	302	3098	126	1413	17	78	102
August	24	105	6	14	14	77	23	214	281	2751	94	996	162	1989	6	52	134
September	69	318	25	105	55	273	28	118	279	1367	56	457	70	577	9	18	129
October	85	502	55	350	68	491	120	1897	102	676	102	759	124	1359	12	118	76
November	170	1107	267	2318	81	547	50	575	22	134	40	788	41	511	28	203	21
December	173	829	119	549	113	705	176	3136	30	256	56	1039	42	501	15	103	20
Year	1302	7574	894	5917	817	5149	669	8268	1580	11292	1139	13311	1404	16410	210	1167	745
Mean velocity	5.8		6.8		6.3		12.4		7.1		11.7		11.7		5.1		

TABLE XVIII.—Number of winds at Hazelmere, 1900, from observations morning and evening.

	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.
January	3	33	0	22	0	4	0	0	0
February	0	41	1	9	1	3	0	1	0
March	0	32	1	19	0	10	0	0	0
April	0	21	0	13	0	25	0	1	0
May	0	24	0	12	0	26	0	0	0
June	1	3	0	19	0	37	0	0	0
July	0	3	0	8	0	51	0	0	0
August	0	5	0	22	0	34	0	1	0
September	0	9	0	29	0	22	0	0	0
October	0	30	0	24	0	7	0	1	0
November	0	32	1	17	0	10	0	0	0
December	0	36	2	18	0	6	0	0	0
Year	4	269	5	212	1	235	0	4	0

TABLE XIX.—Number of winds at Garry Point, 1900, from tri-daily observations.

	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.
January	1	9	41	15	8	3	3	8	5
February	0	10	31	10	7	4	7	8	7
March	0	4	24	16	9	3	11	12	14
April	2	4	12	7	9	7	17	22	10
May	0	1	25	19	15	8	12	8	5
June	1	0	23	18	12	6	9	13	8
July	1	0	27	15	16	9	20	0	5
August	0	1	35	7	11	9	15	2	18
September	1	4	20	7	7	1	13	28	14
October	0	2	31	11	15	1	10	18	10
November	0	6	37	7	4	1	14	8	13
December	2	3	51	8	5	0	4	9	11
Year	8	44	357	140	118	52	135	126	115

TABLE XX.—Number of winds at Kuper Island, 1900, from tri-daily observations.

	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.
January	1	1	5	17	11	7	1	3	47
February	7	5	4	6	7	7	1	8	39
March	3	7	7	10	6	11	0	5	44
April	6	13	3	7	4	9	3	6	39
May	6	13	4	12	12	12	2	6	26
June	1	6	4	16	8	12	2	5	41
July	8	21	2	2	6	2	2	2	43
August	11	14	8	7	4	5	1	4	44
September	3	6	5	2	5	8	3	7	56
October	1	4	2	22	13	4	2	9	36
November	2	4	3	6	18	6	0	5	51
December	4	2	3	16	13	9	0	6	40
Year	53	96	45	123	97	87	17	66	511

TABLE XXI.—Number of winds at Rivers Inlet, 1900, from tri-daily observations.

	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.
January	11.	0	0	31	0	0	0	0	51
February	9	7	0	21	0	4	3	0	40
March	11	9	1	23	0	2	3	0	44
April	6	4	2	17	0	8	8	1	44
May	0	0	0	16	0	6	10	0	61
June	0	4	4	11	0	8	20	0	43
July	1	0	0	4	0	3	25	0	60
August	1	0	0	2	0	5	27	0	58
September	14	3	0	0	0	5	20	1	47
October	6	0	0	30	0	3	5	0	49
November	11	2	7	17	0	2	0	0	51
December	1	0	2	28	0	4	2	0	56
Year	71	29	16	200	0	50	128	2	604

TABLE XXII.—Number of winds at Agassiz Experimental Farm, 1900, from tri-daily observations.

	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.
January	21	0	0	0	33	0	36	3	0
February	27	0	0	0	15	15	24	3	0
March	44	0	7	0	20	0	22	0	0
April	42	0	0	0	27	0	18	3	0
May	27	0	0	0	32	0	34	0	0
June	12	0	0	4	51	0	24	0	0
July	0	0	0	0	78	15	0	0	0
August	9	0	0	0	45	0	36	0	0
September	15	0	0	0	45	0	30	0	0
October	45	0	0	0	33	0	15	0	0
November	69	0	0	1	11	0	9	0	0
December	48	0	0	0	27	0	18	0	0
Year	359	0	7	4	420	30	266	9	0

TABLE XXIII.—Number of winds at New Westminster, 1900, from observations morning and evening.

	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.
January	1	5	26	0	5	3	0	0	22
February	4	10	15	0	1	6	2	1	17
March	2	2	19	1	7	10	1	2	18
April	0	3	12	0	6	17	2	2	18
May	0	3	18	2	5	17	6	0	11
June	0	1	14	2	6	18	1	1	17
July	0	0	10	0	4	25	2	2	19
August	0	1	17	0	8	13	1	0	22
September	1	0	8	0	9	8	3	1	30
October	1	3	23	1	8	5	2	0	19
November	6	3	11	2	2	0	2	2	32
December	2	1	22	0	9	2	0	0	26
Year	17	32	195	8	70	124	22	11	251

Table XXIV.—Number of winds at Port Simpson, 1900, from tri-daily observations.

	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.
January	19	0	0	19	10	1	2	2	40
February	33	0	1	0	0	1	0	2	47
March	24	0	0	0	0	9	0	0	60
April	1	0	1	1	14	16	1	0	50
May	1	0	0	4	20	3	3	2	57
June	2	0	0	0	18	3	12	0	47
July	1	0	0	1	17	6	9	0	56
August	1	1	0	3	20	1	13	0	53
September	4	0	0	0	8	5	10	1	53
October	12	0	0	11	11	5	0	0	42
November	28	3	9	8	10	2	0	2	22
December	16	7	14	7	15	6	6	7	8
Year	142	11	25	54	143	58	56	16	535

Table XXV —Number of winds at Carmanah, 1900, from tri-daily observations.

	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.
January	13	6	34	10	4	3	13	0	10
February	8	11	31	4	2	2	16	1	9
March	8	3	38	6	5	7	9	0	11
April	7	0	21	5	1	2	42	0	12
May	2	0	24	7	10	1	23	0	26
June	......	......	......	......	......	......	......	......	......
July	3	0	9	3	1	1	42	0	31
August	0	0	21	2	3	8	25	1	38
September	3	1	24	7	1	1	20	1	32
October	4	2	37	11	2	7	11	1	18·
November	4	10	45	7	3	8	10	0	3
December	2	5	52	6	4	9	6	1	8
Year	54	38	336	69	36	43	217	5	198

Table XXVI.—Number of winds at Kamloops, 1900, from observations morning and evening.

	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.
January	0	2	7	8	10	2	5	0	28
February	0	2	5	3	5	9	5	5	22
March	1	1	9	7	2	4	4	2	32
April	1	0	8	4	4	0	6	3	34
May	1	1	8	6	6	4	3	0	33
June	0	2	10	5	4	2	1	6	30
July	4	2	4	2	5	4	9	1	31
August	1	1	5	7	3	1	10	4	30
September	1	1	5	0	1	5	8	1	38
October	0	1	9	13	5	4	1	0	29
November	0	0	1	7	2	5	7	4	34
December	2	0	5	16	1	0	3	3	32
Year	11	13	76	78	48	40	62	29	373

TABLE XXVII.—Number of winds at Barkerville, 1900, from observations morning and evening.

	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.
January	1	0	0	0	2	14	5	3	37
February	4	1	0	0	2	12	8	2	27
March	3	1	0	0	9	7	4	2	36
April	4	2	2	5	13	12	3	2	17
May	0	4	0	5	16	13	10	0	14
June	1	1	0	0	21	9	6	3	19
July	2	1	0	0	8	9	9	5	28
August	2	0	2	1	7	10	2	1	37
September	5	2	0	1	4	1	2	3	42
October	2	0	0	1	13	10	2	2	32
November	3	0	0	1	8	10	2	2	34
December	0	1	0	0	18	2	0	1	40
Year	27	13	4	14	121	109	53	26	363

Aggregate amount of Snowfall in the Winter of 1899-1900.

Station.	First snow, 1899.	Last snow, 1900.	Total Amount.
			in.
Victoria	15th December	17th February	6.0
New Westminster	15th December	17th February	10.0
Agassiz	16th December	17th February	10.5
Barkerville	1st October	25th April	114.0
Port Simpson	17th December	7th April	14.9
French Creek	14th December	6th April	12.0
Kuper Island	15th December	17th February	20.6
Hazelmere	17th December	17th February	7.1
N. Nicomin	17th December	17th February	10.5
Matsqui Prairie	15th December	16th February	9.2
Kamloops	11th December	4th March	4.0
Midway	20th November	8th February	21.6
Carmanah	28th November	28th February	6.0
Bella Coola	17th December	9th March	52.6
Tobacco Plains	15th October	4th March	30.0
Nicola Lake	12th October	7th March	15.9
Griffin Lake	5th December	7th March	90.4
Reclamation Works, West Kootenay	5th December	5th March	44.1
Quesnel	10th December	18th February	32.5
Bullion	19th November	21st April	69.9
Chilcotin	17th November	6th March	18.0
Okanagan Mission	5th December	4th March	26.8
Pilot Bay	5th December	6th March	38.1
Masset	27th December	7th April	29.5
Alberni	15th December	7th March	19.8
Enderby	4th December	21st March	50.0
Stuart Lake	17th October	26th March	46.8
Vancouver	15th December	16th February	8.0
Garry Point	16th December	17th February	8.7
Revelstoke	30th November	8th April	69.5
Cumberland	14th December	7th March	28.0
Langley	16th December	16th February	10.5
Royal Oak	14th December	16th February	10.7
Goldstream Lake	15th December	17th February	19.5
Nanaimo	15th December	16th February	9.0
Rivers Inlet	14th December	24th April	3.0

PERIODICAL EVENTS AT STATIONS IN BRITISH COLUMBIA DURING THE YEAR 1900.

	Victoria.	French Creek.	Quatsino.	Alberni.	Stuart Lake.	Agassiz.	Hazlemere.	North Nicomin.	Matsqui Prairie.	Nicola Lake.	Barkerville.	Rivers Inlet.	Kuper Island.	Port Simpson.	Carmanah.
Last snow	Feb. 17	April 6	April 7	March 7	March 26	Feb. 17	Feb. 17	Feb. 17	Feb. 16	March 7	April 25	April 24	Feb. 17	April 7	Feb. 28
Last frost	March 27	April 27	April 26	April 28	July 10	April 25	April 28	April 27	April 26	May 29	June 23	April 27	April 10	April 25	April 25
First thunder	May 3	March 9	....	Jan. 21	May 4	....	March 25	Feb. 21	....	May 23	May 8	Jan. 6	July 24	Oct. 31	....
Warmest day	August 1	July 22	July 23	July 20	July 23	July 22nd	July 30	July 22	July 22	July 24	July 24	July 22	July 31	July 22	July 19
Mean temperature	67° 7′	68° 5′	66° 0′	72° 6′	59° 6′	70° 5′	64° 0′	70° 0′	70° 0′	72° 5′	68° 0′	69° 2′	74° 8′	60° 7′	61° 5′
Heaviest day's rain	Jan. 12	March 8	August 1	Dec. 12	Nov. 5	March 10	March 9	March 9	March 8	Oct. 22	Aug. 16	March 9	March 9	Dec. 6	Dec. 16
Amount in inches	1.23	1.40	2.20	3.10	0.90	1.93	1.97	3.12	2.08	1.09	0.98	3.95	3.61	20.3	4.07
Last thunder	August 1	June 28	August 1	Sept. 16	....	....	August 5	Sept. 22	....	August 11	August 25	June 27	Aug. 8	Dec. 1	....
First frost	Nov. 17	Sept. 26	October 2	Sept. 25	August 5	Nov. 4	Sep. 25	Sept. 24	Sept. 24	Sept. 25	August 26	Nov. 16	Sept. 30	Oct. 2	Nov. 17
First snow	Oct. 22	Nov. 16	October 22	Nov. 17	Sept. 30	Nov. 16	Nov. 22	Nov. 16	Nov. 17	Oct. 3	Sept. 28	Nov. 16	Nov. 17	Nov. 20	Nov. 17

	Enderby.	Okanagan Mission.	New Westminster.	Garry Point.	Reclamation Works, W. Kootenay.	Midway.	Tobacco Plains.	Griffin Lake.	Kamloops.	Vancouver.	Rossland.	Quesnel.	Bullion.	Coldstream Ranch.	Masset.
Last snow	March 21	March 4	Feb. 17	Feb. 17	March 6	Feb. 8	March 4	March 7	March 4	Feb. 16	April 7	Feb. 18	April 21	....	April 7
Last frost	May 23	May 23	April 9	April 10	April 24	June 21	May 28	May 29	April 9	April 10	May 29	June 9	June 8	April 23	April 22
First thunder	June 25	April 5	March 24	April 1	May 3	....	April 27	April 6	....	April 1	May 5	....	May 10	....	....
Warmest day	July 21	July 4	August 1	July 31	August 1	July 31	June 24	June 27	July 24	August 1	July 20	July 23	June 24	July 23	July 22
Mean temperature	81° 0′	76° 7′	68° 2′	65° 0′	74° 5′	78° 0′	80° 6′	84° 0′	76° 5′	72° 3′	79° 2′	71° 0′	73° 0′	76° 5′	62° 0′
Heaviest day's rain	Sept. 21	....	March 9	March 10	Dec. 20	Sept. 22	May 16	August 18	July 5	March 9	Dec. 20	June 28	June 30	June 7	Nov. 6
Amount in inches	1.02	....	4.10	1.93	1.53	0.66	0.97	3.20	0.70	4.83	1.32	1.06	1.10	0.50	1.95
Last thunder	....	....	August 15	August 5	Sept. 7	....	Sept. 17	Oct. 1	....	August 15	Oct. 26	....	July 15	....	....
First frost	Sept. 25	Sept. 25	Sept. 30	Sept. 30	Sept. 25	August 25	August 4	Sept. 25	Sept. 26	Sept. 30	Sept. 26	Sept. 24	August 25	Sept. 25	....
First snow	....	....	Nov. 17	Nov. 17	Nov. 15	Nov. 16	Oct. 4	Nov. 16	Nov. 15	Nov. 17	Oct. 3	Nov. 19	August 25	Nov. 16	Nov. 23

Seasonal Notes.

CLAYOQUOT.—October 1st, geese going south. November 17th, first snow. December 25th, thunder-storm; 6 a. m., 1 inch of hail fell.

MASSET.—May 10th, earthquake, 4 p. m. June 19th, earthquake, 1 p. m. July 13th, earthquake, 10.30 a. m. December 10th, daisies and primroses in bloom.

VANCOUVER.—5.97 inches of rain fell from 10 p. m. on March 8th to 10 a. m. on 10th.

ALBERNI.—January 1st, yellow violets out; 7th, chinook, snow all gone; 21st, lightning. March 3rd, robins back; 4th, gooseberries coming into leaf; 9th, thunder; 18th, peach blossoms out; 26th, dogtooth violets and salmonberries in flower. April 14th, cherries in bloom; 15th, plums in bloom; 16th, humming birds, strawberries out; 17th, pears in blossom; 23rd, brambleberries in flower; 25th, apple and crab-apple in blossom. May 13th, white clover in bloom; 24th, thimbleberries in blosson. June 2nd, cranberries in blossom; 12th, cherries ripe; 19th, huckleberries ripe; 30th, hay cutting. July 7th, timothy in blossom; 11th, army worm very bad. October 18th, robins gone. November 17th, first snow in valley.

BULLION.—January 5th, chinook; 17th, chinook, snow going fast. May 25th, heavy wind storm.

QUATSINO.—June 10th, new potatoes. October 4th, thin ice; 22nd, snow on hills.

ENDERBY.—February 21st, geese going north; 25th, robins and larks arrived. March 12th, bees with pollen; 27th, butterflies.

TOBACCO PLAINS.—January 6th, chinook, snow all gone; 12th, buttercups in blossom; 14th, rhubarb in garden well up; 18th, ploughing going on; 26th, ground frozen again, everything cut down. March 13th, robins and blue-birds; 14th, larks; 15th, geese passing; 16th, ploughing. April 1st, swallows; 22nd, currants and strawberries in blossom; 24th, cut first rhubarb. May 25th, tender plants injured by frost. June 2nd, first wild strawberries ripe; 10th, strawberries ripe; 18th, currants and gooseberries ripe; 23rd, potatoes in blossom. July 2nd, shipping new potatoes, cabbage, etc. August 3rd, harvest in full swing. September 3rd, grain harvest stacked in good order; 26th, tender plants touched; 27th, robins, larks and blue-birds still here. October 11th, summer birds collecting in flocks and leaving. December 17th, ploughing general.

N. NICOMIN.—February 7th, robins arrived; 21st, thunder; 28th, spring birds about. March 15th, bird cherries in bloom; 17th, flowering currant in bloom; 27th, salmonberries, plums and peaches in bloom. April 9th, ice ⅛ inch thick; 11th, cherries and apples in bloom; 26th, planting potatoes. May 14th, swallows. July 19th, hay cutting. October 18th, leaves falling fast.

VANCOUVER.—February 14th, great harm to shrubs, etc. March 20th, black caps here.

RIVERS INLET.—January 6th, thunder. February 23rd, snowdrops in bloom. April 3rd, humming birds and bees; 22nd, swallows arrive.

KUPER ISLAND.—February 22nd, frogs piping; 22nd, crocuses and other flowers in bloom· March 13th, robins; 14th, blue grouse hooting; 15th, butterflies. April 1st, humming-birds·

BARKERVILLE.—March 17th, butterflies and robins. May 5th, swallows; 18th, violent hailstorm.

NEW WESTMINSTER.—March 9th, chinook; 28th, heavy frost.

IMPORTS

Into British Columbia from other countries and provinces of such products of agriculture and its branches as can be produced in the Province, for the year ending 30th June, 1896, and the year ending 30th June, 1900.

			Year ending 30th June, 1896.			Year ending 30th June, 1900.		
			Quantity.	Value.	Duty.	Quantity.	Value.	Duty.
Live Stock:								
Horned Cattle	Other Countries,	head	123	$ 2,603	$ 520 60	447	$ 9,207	$ 1,841 40
"	" Provinces,	"	2,099	115,455	....	7,829	219,870	....
Horses	" Countries,	"	1,159	30,032	6,006 40	980	45,334	9,069 30
"	" Provinces,	"	186	11,532	....	1,175	72,850	....
Sheep	" Countries,	"	45,771	70,158	14,032 50	44,741	96,394	19,278 80
"	" Provinces,	"	1.500	6,000	....	7,944	19,860	....
Swine	" Countries,	lbs.	211,336	6,313	3,170 07	68,167	3,909	1,022 53
"	" Provinces,	head	3,697	29,576	....	5,825	58,250	....
All other	" Countries,	"	....	7,967	1,593 40	....	10,170	2,031 00
Meats, &c.:								
Bacon and hams	" "	lbs.	1,304,950	125,232	24,618 00	3,089,608	329,318	63,149 59
Lard	" "	"	265,068	19,327	4,623 34	223,175	19,491	4,519 70
Bacon, hams and lard	" Provinces,	"	1,368,000	164,160	....	4,048,000	465,520	....
Beef (fresh or salt)	" Countries,	"	130,481	5,766	201 62	105,563	7,508	162 66
Beef and mutton	" Provinces,	"	114,000	9,120	....	2,610,000	182,700	....
Mutton	" Countries,	"	40,777	1,616	541 94	756,808	31,661	8,472 98
"	" Provinces,	"	(Included	with beef.)		(Included	with beef.)	
Pork	" Countries,	"	47,133	2,614	206 66	30,557	2,437	119 14
"	" Provinces,	"	410,000	30,750	....	838,000	67,040	....
Poultry	" Countries,	"	....	5.391	1,078 20	....	16,221	3,239 05
"	" Provinces,	"	192,000	24,960	....	480,000	48,000	....
Canned and other	" Countries,	"	757,323	56,439	15,128 05	980,190	102,464	20,751 59
Tallow	" "	"	8,052	331	59 80	10,526	447	89 40
Grain, Seeds, &c., Breadstuffs and Produce of:								
Biscuit	Other Countries,	"	277,357	14,433	3,533 00	151,593	8,293	2,011 14
Buckwheat meal	" "	"	20,155	593	55 22	84,472	1,648	211 22
Corn meal	" "	bbls.	1,215	2,918	486 05	1,255	2,571	313 78
Oatmeal	" "	lbs.	205,113	3,880	775 40	4,776	272	54 40
Rye flour	" "	bbls.	123	432	66 64	428	1,558	214 00
Wheat flour	" "	"	26,787	69,161	20,347 19	22,541	61,120	12,723 30
" and meal, all kinds	" "	"	63,490	286,705	....	108,120	594,660	....
Bran and mill feed	" "	lbs.	....	42,985	8,597 00	....	56,265	11,253 00
" "	" Provinces,	"	1,712,000	13,696	....	3,668,000	23,842	....
Other breadstuffs	" Countries,	"	....	7,982	1,590 80	....	22,023	4,354 70
Barley	" "	bush.	32,573	8,661	2,598 32	1,060	623	177 68
"	" Provinces,	"	2,708	1,083	....	21,280	8,512	....
Beans	" Countries,	"	12,454	11,572	1,817 54	8,495	12,404	1,336 34
Indian corn	" "	"	11,997	6,243	899 36	89,958	40,198	(Free.)
Buckwheat	" "	"	293	170	29 30	10	18	1 00
Oats	" "	"	164,475	42,508	18,730 81	22,387	11,585	2,238 70
"	" Provinces,	"	95,647	33,476	....	573,952	200,883	....
Peas	" Countries,	"	1,250	968	122 60	2,373	2,033	237 30
Rye	" "	"	1.072	579	107 20	797	544	97 70
Wheat	" "	"	169,471	73,891	18,992 43	24,769	13,809	2,972 28
"	" Provinces,	"	14,800	11,840	....	110,366	88,292	....
Flaxseed	" Countries,	lbs.	25,856	530	(Free.)	40,680	1,019	....
Beet, carrot, turnip, &c	" "	"	1,539	316	(Free.)	....	....	....
Other	" "	"	....	8,477	892 70	....	....	....
Fruit and Vegetables:								
Apples (dried)	" "	"	165,841	7,754	1,888 00	79,300	5,440	1,669 87
" and other (dried)	" Provinces,	"	50,000	3,750	....	784,000	62,720	....
Plums and prunes (dried)	" Countries,	"	193,629	8,475	1,921 58	511,757	21,455	5,038 63
Almonds, filberts and walnuts	" "	"	75,558	5,809	2,254 81	386,315	43,324	8,766 35
Apples (green)	" "	bbls.	8,051	26,377	3,112 32	8,974	37,491	3,469 80
" "	" Provinces,	"	812	2,598	....	8,330	33.320	....
Small fruits	" Countries,	lbs.	52,968	3,678	1,053 92	140,877	10,645	2,810 34
Cherries	" "	quarts	50,612	4,781	1,006 44	87,350	6,700	1,725 00
Cranberries	" "	bush.	239	768	190 50	1,535	2,211	552 75
Currants	" "	quarts	229	9	4 58	(lbs.) 872	58	17 44
Peaches	" "	lbs.	249,912	7,534	2,481 32	495,333	15,436	4,929 33
Plums	" "	bush.	63,750	3,968	978 05	13,143	9,791	2,422 25
Quinces	" "	"	50	71	17 75	635	490	122 50
Carried forward			....	$1,453,013	$16,633 41	....	$3,209,899	$203,470 94

IMPORTS.—*Concluded.*

			Year ending 30th June, 1896.			Year ending 30th June, 1900.		
			Quantity.	Value.	Duty.	Quantity.	Value.	Duty.
Brought forward			....	$1,453,013	$16,633 41	....	$3,209,899	$203,470 94
FRUIT AND VEGETABLES—(*Concluded*):								
Canned fruits	Other Countries,	lbs.	331,664	13,726	7,222 32	......	58,506	22,395 68
" " and vegetables.	" Provinces,	"	2,106,000	71,410	....	3,670,000	122,333	....
Jams, jellies, &c.	" Countries,	"	48,282	3,683	1,602 64	311,531	22,447	5,953 10
All other dried fruits and nuts.	" "	"	....	....	....	701,931	50,806	12,148 00
Melons	" "	No.	13,383	854	211 50	5,180	823	205 75
Tomatoes	" "	bush.	1,109	1,917	381 71	1,895	4,107	787 77
Potatoes	" "	"	39,203	14,362	5,834 14	36,935	23,363	5,496 90
"	" Provinces,	"	3,560	1,335	....	47,550	7,125	....
Other vegetables	" Countries,	lbs.	98,198	4,408	1,565 25	318,846	61,106	14,144 56
TREES AND BUSHES:								
All kinds	" "	No.	14,612	1,783	523 76	....	1,624	324 80
"	" Provinces,	"	5,500	1,375	....	....	5,750	....
OILS:								
Lard	" Countries,	gals.	1,597	995	142 20	642	282	70 50
Neatsfoot	" "	"	59	78	33 00	266	164	41 00
Linseed	" "	lbs.	16,866	7,697	1,468 60	84,255	15,198	2,868 70
"	" Provinces,	"	202,000	13,241	....	....	....	....
DAIRY PRODUCTS:								
Butter	" Countries,	"	308,809	52,100	11,159 04	563,913	126,841	20,522 96
"	" Provinces,	"	1,672,000	367,840	....	2,258,000	564,500	....
Cheese	" Countries,	"	32,878	4,695	987 79	78,155	11,040	2,311 23
"	" Provinces,	"	400,000	38,000	....	840,000	84,000	....
Condensed milk	" Countries,	lbs.	221,373	21,136	7,224 56	1,417,748	124,610	40,799 71
"	" Provinces,	cases	16,600	95,450	....	35,400	177,000	....
CHICORY	" Countries,	lbs.	16,177	617	535 06	5,699	220	248 12
"	" Provinces,	"	....	....	....	....	....	....
CIDER	" Countries,	gals.	1,470	722	124 03	1,330	834	104 65
HAY	" "	tons.	2,556	24,847	5,124 04	4,207	53,784	8,414 00
"	" Provinces,	"	....	....	....	1,889	12,890	....
STRAW	" Countries,	"	17	52	10 40	....	....	....
HOPS	" "	lbs.	19,265	1,745	1,164 24	48,361	6,914	2,901 66
HONEY	" "	"	23,349	2,579	760 46	58,339	5,876	1,605 72
MALT	" "	bush.	55,227	35,140	8,288 58	75,305	54,596	11,284 55
"	" Provinces,	"	2,640	1,782	....	....	....	....
MUSTARD	" Countries,	lbs.	15,314	3,896	1,065 00	24,065	6,402	953 37
EGGS	" "	dozen	272,629	34,568	8,322 11	346,617	57,407	10,382 00
"	" Provinces,	"	558,972	83,845	....	1,226,400	183,960	....
OIL CAKE AND MEAL	" Countries,	cwt.	3,492	3,468	(Free.)	2,399	3,005	(Free.)
PICKLES	" "	gals.	11,803	7,174	2,844 10	38,443	27,173	6,801 35
Add to above the following animals imported from other countries for breeding purposes and therefore entered duty free:—								
HORSES		head	4	795	(Free.)	58	12,830	....
CATTLE		"	13	1,300	"	61	4,517	....
SHEEP		"	4	105	"	4	40	....
FOWLS		"	....	409	"	186	597	....
SWINE		"	10	156	"	3	80	....
				$2,362,298	$232,925 94	....	$5,108,599	$374,187 11

Malt and Linseed Oil were inadvertently omitted in compiling the imports from the other Provinces. Taking the last statistics we find that Malt to the value of $1,782 and Linseed Oil to the value of $13,241 were imported. Judging from the increase in all lines, we may therefore safely add these figures to the total above, viz $5,108,599

Malt	1,782
Linseed Oil	13,241
	5,123,622
Add duty	374,187
	$5,497,809

NOTE.—The duty noted in these tables is the amount paid during the year, but may not represent the exact amount of duty payable on the importations for that year, as some articles may have remained in bond.

DAIRYING.

This branch of agricultural industry is, day by day, attaining more prominence and receiving greater attention, with corresponding profitable returns. Mr. J. Stonehouse, a gentleman of great experience in dairying, who was sent to the Province by the Dominion Government to address the fall meetings of Farmers' Institutes, furnished the following, which I now publish, as illustrative of the profits in this line by application and industry:—

Statement of Mr. Urquhart's Dairy Herd, Courtenay, B. C.

In 1899, 35 cows produced 12,800 pounds of butter, and I drew from one merchant in Nanaimo $2,969.37.

In 1900, up to October 31st, 37 cows produced 12,191 pounds butter, and those cows will produce 2,000 pounds more before the expiration of the year, and the butter has sold at an average of about 27 cents. I have sold $600 worth of hogs this year, and have $200 worth more to sell. I work 110 acres of land, which produces all my feed, with the exception of $200 worth of bran.

My last milk record was made up the year ending 17th of May, 1900, my herd of 54 cows averaging 10,933 pounds of milk; average test of fat, 3½; average amount of butter per cow, 446 pounds. The year before, my herd of 55 cows averaged 11,474 pounds milk and 468 pounds butter. You will see that my average is not quite as good as the year before, owing to the very severe drought, poor pasture, and my having quite a large number of heifers with first calf included in the herd. My heifers have not done as well the past year as formerly, by reason of my not having as good a bull; but the one I now have is giving better stock, so I hope to see next year's heifers doing better. I weigh each cow's milk separately once a week, and take the average from that to keep a yearly record, and keep weeding out the poorer cows that will not give 6,000 pounds of milk.

I milk our cows from ten to twelve months, and a few of them intended for the butcher, and some of the heifers, two or three months longer, making the average time in lactation nearly twelve months. My best cow, which gave 20,100 pounds of milk during the year ending May, 1899, has not gone dry yet this season, and she has been milking now nearly fifteen months, but from some cause has not done as well as she did last season. Taking my cows in lots of ten, I find that the best ten averaged 15,829 pounds of milk and 646 pounds of butter; second best 10 averaged 12,643 pounds of milk and 516 pounds of butter; third best ten averaged 10,895 pounds of milk and 445 pounds of butter; fourth best ten averaged 9,314 pounds of milk and 380 pounds of butter; fifth best ten averaged 7,810 pounds of milk and 319 pounds of butter. Fifty cows averaged 11,300 pounds, and four of the poorest 6,368 pounds.

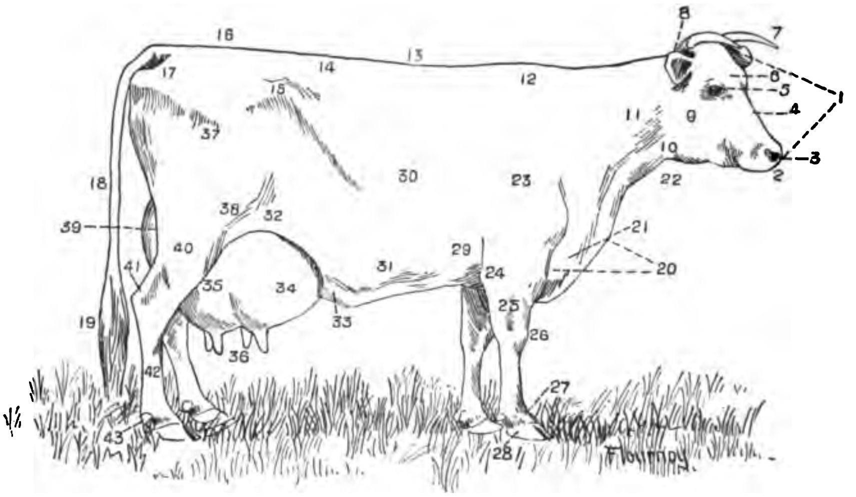
I feed silage, with a little clover hay, all summer, even when the cows are on fairly good pasture; also a half winter ration of grain, consisting of bran mixed with pea or corn chop or meal. I find cotton seed meal the best to mix with bran for summer feed. My farm is mostly of a dry, sandy soil, and pasture quickly dries up in time of drought, but corn and clover do well, so that I grow large crops of each, with corn silage enough to feed all summer. I have six silos—three small ones for summer use and three large ones for winter use—holding in all 900 tons. I put a partition in one this summer, making two small ones for summer use, as a large silo is not good for summer. I sometimes feed green alfalfa clover in summer for a change, but find silage the most convenient and cheapest feed for summer, and silage and good clover hay for winter. I am a great believer in silage, and I built the first silo in Ontario over twenty years ago, and have been feeding it ever since. I keep about 150 head of cattle and 300 pigs. I cut and feed green alfalfa to my hogs in summer, and find it an excellent feed for them, along with grain. In winter I feed mangels along with the grain. I turn off from 400 to 500 nice bacon hogs in the course of a year. I grow the large Yorkshire pigs, and always get the highest price going. I have just sold a lot to-day for 6 cents per pound, live weight. I make butter from nearly all my milk, so that I have lots of fresh skim milk for calves and young pigs.

I am now getting from 25c. to 28c. per pound for my butter, which pays better than making cheese, when we consider the value of warm skim milk, fresh from the separator, for feeding to young stock.

Scale of Points for judging a Dairy Cow, regardless of Breeds.

(*From the Year Book, U. S. Department of Agriculture, 1900.*)

In the accompanying illustration are indicated the parts of the cow taken into consideration in judging her merits as a dairy animal.



(Year Book, 1900, U. S. Department of Agriculture.)

FIG. 88.—DIAGRAM OF COW, SHOWING POINTS.

1. Head.
2. Muzzle.
3. Nostril.
4. Face.
5. Eye.
6. Forehead.
7. Horn.
8. Ear.
9. Cheek.
10. Throat.
11. Neck.
12. Withers.
13. Back.
14. Loins.
15. Hip bone.
16. Pelvic arch.
17. Rump.
18. Tail.
19. Switch.
20. Chest.
21. Brisket.
22. Dewlap.
23. Shoulder.
24. Elbow.
25. Forearm.
26. Knee.
27. Ankle.
28. Hoof.
29. Heart girth.
30. Side, or barrel.
31. Belly.
32. Flank.
33. Milk vein.
34. Fore udder.
35. Hind udder.
36. Teats.
37. Upper thigh.
38. Stifle.
39. Twist.
40. Leg, or gaskin.
41. Hock.
42. Shank.
43. Dew claw.

In judging dairy stock, 100 is assumed to represent the ideal or perfect dairy cow. The following is a list of the general qualities and particular parts considered, with the figures at the right indicating the "weight" or importance attached to each in making up the total of 100 points which stands for perfection:—

GENERAL APPEARANCE:

Constitutional vigour, as shown by size, apparent health, strength, activity and "general appearance"	5
Form, wedge-shaped as viewed from front, side and top	5
Quality, hair fine, soft; skin, medium thickness, loose, mellow and unctuous, with yellow secretion	5
Temperament, active and nervous (but not "wild"), indicated by movements, eyes and lean appearance	5

HEAD AND NECK:	
Forehead, broad and full	2
Horns, small and fine, not too long, set well apart	1
Eyes, large, prominent, bright and yet placid	1
Face, lean, not too short, straight or slightly dished	1
Muzzle, clean and strong, mouth and nostrils large	1
Ears, medium size, fine in texture, yellow secretion abundant	1
Neck, rather long and thin, fine; clean throat and light dewlap	1
FOREQUARTERS:	
Chest and brisket, broad and strong, low, but not too fleshy	3
Withers, well defined, firm and lean	1
Shoulders, light, not fleshy, and oblique	1
Legs, straight, rather short, and not too large or coarse	3
BODY:	
Back, well defined, lean, open-jointed, not too level, and smooth; a good spine	3
Barrel or body, long and large; ribs, broad, well arched, open, and well defined; a large, strong body	8
Heart girth, large and deep; abundant room for active heart and lungs	4
Belly, large, broad and deep, with a large and strong navel	6
Loin, broad and strong	3
HINDQUARTERS:	
Hips, wide apart	2
Pelvic arch, prominent and strong	3
Rump, long and wide	2
Tail, long, fine, with a good switch	1
Thighs, long and lean, no beefiness; thin flanks	3
Legs, straight, rather short, wide apart, giving open twist, and not too large or coarse	3
Fore udder, full, broad, and extending well forward; not fleshy	8
Hind udder, broad, full, and attached high; not fleshy	8
Teats, of good size and form, evenly placed	5
Milk veins, upon the udder and in front of it, prominent, large and tortuous, leading to large, open "milk-wells"	5
	100

NOTES.

In scoring or marking, give to each part the number of points which it appears to deserve upon the scale given; use fractions of one-fourth if necessary. Thus: if forehead is broad, full and satisfactory, mark 2; if neck is short, thick and beefy, mark ½ or ¼, or, perhaps, 0; if fore udder is deficient or defective, mark 6, 4 or 2, as the case may be. A good cow, closely criticised and scored, should have a total of 80 points or more.

SILOS AND ENSILAGE.

——o——

Indian Corn.

This fodder plant, par excellence the best for making ensilage, is not cultivated to that extent, in the Province, which its undeniable merits entitle it. There seems to be a variety of reasons for this neglect, the principal one being, as far as I could ascertain, the belief that it will not mature sufficiently, some people averring that it will not ripen with them. As a matter of fact, it has been ascertained beyond a doubt that Indian corn can be profitably grown in many parts, and since it only requires to attain the glazing stage for making silage, the fact of its not ripening does not matter. The fact, also, that clovers grow so easily and yield such large crops has been a great factor in deterring farmers from trying experiments with corn. Now, valuable as clover is on a farm, both as a feed and as a fertilizer—and in these respects too much cannot be said in its favour—Indian corn unquestionably is superior, both as regards production and quality, for making into ensilage, and it is for that reason I so strongly urge its cultivation by our farmers, especially those who go in for winter dairying, and which, without ensilage for feeding to the cows, is almost certain to be attended with little or no profit. Like everything else, there are many kinds of corn, and of the many kinds which are grown many are quite unsuitable for our climate. The very large varieties are not found to be the best, but good, medium-sized, early varieties are recommended, such as the following:—Earliest—Compton's Early; a little later—Butler's Dent or Early Butler; and a little later—Longfellow; still later—Wisconsin White Dent.

The following article is from "Farmer's Advocate," 16th September, 1901:—

SILOS AND SILAGE.

Twenty years ago there were not twenty-five silos in America. At the present time there are fully half a million. There must be reasons for their rapid introduction. The first is, a silo enables us to feed our milk cows sufficient food in the winter, instead of dry hay or straw. There is less waste than is possible with any other system of feeding. Then there is such saving of time and storage over the system of shocking by sudden change of feed, which changes are so readily noticed in the flow of milk.

It is well known that all silage has not the same feeding value; that this depends entirely on the quality of the silage. This quality is not obtained solely from the structure of the silo, although a silo must be air-tight and not allow the silage to freeze; but rather in the quality and condition of the corn when harvested.

Corn planted for the silo should be planted the same as for ears, say three feet each way, and thoroughly hoed and cultivated, to keep the ground clean and moist, as long as a horse can go through it without breaking it down.

A few years ago everyone in this locality went in for raising the large western varieties, which never fully matured, although they often reached a height of 15 and 16 feet. Now we are better educated in corn-growing, and plant some variety which will yield as good a crop of ears as possible, valuing the ears for silage of greater value than long, leafless stalks. Longfellow Yellow Flint is extensively grown here when planted early; but if the season is backward, like this year, we use as early a maturing variety as possible, Compton's Early, or North Dakota White Flint, being favourites for late seasons.

As to the proper time for filling, the general opinion is to cut in the doughy stage, just before maturity. If cut too early it is too soft and the silage is poor and sour.

Mix well when filling, and pack as solid as possible; and if too dry, wet the top thoroughly, sowing a pan of oats on top to grow an air-tight covering.

For the benefit of others, I would like to give two peculiar cases that came under my observation and may be of untold value to some reader of the "Farmer's Advocate."

Four years ago, when the crop was just in the milk, one night there was a heavy frost, and everyone thought the corn crop was spoiled. There was a great rush to fill silos, the corn being all white and wilted, it taking three or four days before some silos were filled. But, curiously enough, the silage made was of a first-class quality, apparently not injured in the least by the frost.

Another and more interesting experiment was tried by a near neighbour last fall. He had his corn about a mile and a half from his silo, and could not get teams enough at the time for filling to haul it, so he cut and shocked his corn when it was nicely glazed. He then went at his ploughing and waited till the ground froze up; then he drew his corn into a monster pile in the yard, it snowing on it one of the days he drew it, and then he cut and filled his silo. For two days he kept the top covered with water, then left it to settle, and when opened was pronounced by experts "good silage."

RAPE.

This valuable fodder plant has so far received but little attention at the hands of our farmers, although its cultivation has been repeatedly urged upon their attention. With the object of encouraging its production, a quantity of Dwarf Essex Rape seed, which had been kindly donated by Dr. James Whithycombe, Vice-Director of the Oregon Experimental Station, Corvallis, on the occasion of my recent visit to that State, was distributed amongst the farmers of the Province, with the following instructions:—

"Two and a half pounds will sow one acre, if drilled in half an inch and 21 inches apart, but it will take 5 pounds if sown broadcast. Rape may be sown at almost any season of the year in this Province. A very good plan is to sow it in the fall and use for succulent feed in the early summer. Aphis are liable to attack it in August if it is sown in early spring. I would, therefore, recommend it as late crop. In Ontario it is sown from 25th June to 5th July, although a fair crop may be obtained when it is sown earlier, and a fall crop may sometimes be grown as late as the end of July. For catch crops it should be sown as soon as possible after the previous crop has been removed."

In evidence of the value of this fodder plant, I quote the following:—

Rape as a Forage Crop.

Evidence given by Prof. F. T. Shutt, Chemist, Central Experimental Farm, before the Select Standing Committee on Agriculture and Colonization.

It is only within the last few years that Rape has become well known, and I doubt if at the present time a large proportion of farmers know about this crop.

Q.—I saw rape growing about 30 years ago.

A.—Oh, no doubt, but it has not received general attention until the last few years. In older countries and in Europe, of course, it has been well known and cultivated for generations, but there is very little known by our people, save in few districts, about rape. We have found it a rapid grower, and it gives a large yield of food which is palatable and nutritious. It is useful as green fodder for pigs and sheep and steers, and there is no doubt about it becoming a more and more important soiling crop in this country. Rape cannot be used as a hay; the leaves crumble as they dry, so that its use is as a green crop for soiling, or for pasturing our pigs, sheep or steers on it.

Q.—What kind of silo plant is it?

A.—We have no experience and cannot speak with certainty on that point, but I do not think it suitable for the silo. Rape contains from 88 to 93 per cent. of moisture, and that is too large a proportion to make good ensilage. Its value is as a green crop, either for soiling or pasturing our stock on it. We made some experiments and determined the relative feeding value of the stalks and the leaves. We found that the leaves were more nutritious than the stalks, and, consequently, it was better to sow the rape fairly thick, which would induce the growth of leaves, rather than thinly, which induces heavy and woody stalks. The large or thick stalks are only eaten by cattle and not by sheep and pigs. The water in rape is somewhat larger than in roots, varying from 93 per cent. in plants one month old to 89 per cent in plants three months old; so that, weight for weight, the very young plant does not contain as much dry matter as roots, such as mangels. The dry matter in rape, however, is particularly rich in nitrogenous compounds, and this fact explains its excellent feeding qualities. I was at a loss at first to understand why animals did so well on it, but our analyses explained the matter. We find that rape is richer in the nitrogenous compounds, albuminoids or proteids, as they are called, than are root crops. In this respect rape approaches in composition clover, which, as you will remember, is a plant very rich in nitrogenous compounds. Our experiments prove that it is in the earlier stages that rape takes from the soil the larger part of its plant food. That fact shows the necessity of having the soil well prepared and manured, so the plant may easily get sufficient food while still young. The "dry matter" in the young plant is richer in protein, and is more nutritious than the dry matter in the older plant. That is, a plant two months old is richer in nutriments than one four months old; but as there is a larger crop in the four months' growth, and there is less water in the plant at that stage, we have an offset in increased yield against the somewhat lower feeding value. In my report this year that matter is taken up more thoroughly. We have been using it largely for our sheep and pigs at the farm.

To sum up the foregoing observations, we may conclude (1) that the rape plant of four to six weeks old contains more water and less dry matter than that of three months; (2) that the dry matter of the younger plant is relatively richer in fat and albuminoids (protein) than that of the older rape; (3) that the non-albuminoid nitrogenous compounds decline as the season advances; (4) that the percentage of fibre increases with the age of the plant, due to the greater development of the stalk; (5) that the nitrogen free extract increases with the growth of the plant; (6) that the percentage of ash in the dry matter decreases as growth progresses. It would appear, therefore, that on the whole the dry matter of the six weeks' old rape has a higher feeding value than that of rape of three months' growth, but that, owing to the increased percentage of dry matter in the mature plant and the much larger yield of crop obtained from the latter, the feeding value per acre at the more advanced period of growth is the greater; and this will probably be more emphasized in rape sown broadcast than in drills, as the proportion of stalk to foliage in the former will be less.

Q.—Do you allow your steers to pasture?

A.—No; we cut it and feed to them, but the pigs and sheep are pastured. They all seem to like it.

Q.—What time do you sow rape?

A.—All the way from May and June to August. We had it going on, a succession of crops throughout the summer.

Q.—How long after sowing it can you begin to pasture?

A.—We began to pasture ours usually at from four to six weeks. I think it is not good to pasture too severely when the crop is young. We obtained yields of over twenty tons to the acre from a three months' crop, followed by a growth of say two to three tons.

Q.—Before leaving rape, do you indicate in your reports that there is danger in allowing cattle, for instance, to feed too freely on rape?

A.—I presume there is a danger, but as in all our experiments the cattle had it cut and fed to them, we had no trouble on that score. I presume rape is similar to clover in causing bloating. Of course rape cannot be used for dairy cattle, for milch cows. It belongs to the same class of plants as turnips, and they contain an oil which taints the milk.

Q.—I refer to the danger of bloating?

A.—No doubt they should be fed lightly at first to obviate that danger.

GRASS SEED PER ACRE.

(Year Book, U. S. Department of Agriculture, 1897.)

	Pounds per acre.	Weight per bushel.
Red Top (*Agrostis alba*)	9.7	8 to 32 lbs.
Meadow grass (*Poa pratensis*)	17.5	....
Sheep Fescue (*Festuca ovina*)	28.	10 to 15 lbs.
Brome grass (*Bromus inermis*)	44.	....
Rye grass (*Lolium perenne*)	55.	18 to 30 lbs.
Italian Rye grass (*Lolium italicum*)	48.5	12 " 24 "
Orchard grass (*Dactylis glomerata*)	35.	12 " 16 "
Meadow Fescue (*Festuca pratensis*)	52.	12 " 26 "
Alsike (*Trifolium hybridum*)	12.3	94 " 100 "
Timothy (*Phleum pratense*)	16.	48 lbs.
Sainfoin (*Onobrychis sativa*)	78.	40 "
Red Clover (*Trifolium pratense*)	18.	64 "
White Clover (*Trifolium repens*)	10.5	63 "
Alfalfa (*Medicago sativa*)	25.	63 "

FRUITS.

The following useful information is given for the use of orchardists:—

List of varieties of fruit adopted by the Board of Horticulture at a meeting held on the 23rd of November, 1900, as one to be safely recommended generally for orchards for commercial purposes. It must be understood, however, that the list does not contain the names of all the varieties which may be safely and, probably in many cases, profitably grown.

FOR VANCOUVER AND OTHER ISLANDS.

APPLES.—Late summer—Yellow Transparent. Early Fall—Duchess of Oldenburgh. Fall—Wealthy and Blenheim Orange. Winter—King of Tompkins County, Canada Reinette, Lemon Pippin and Salome. Crabs—Florence and Hyslop.

PEARS.—Fall—Bartlett, Beurre Boussock. Late Fall—Louise Bonne de Jersey, Beurre Clairgeau.

PLUMS.—Early—Peach Plum. Mid-season—Black Diamond and Monarch. Late—Pond's Seedling, Yellow Egg and Coe's Golden Drop.

CHERRIES.—Early—Black Tartarian, sweet. Later—Royal Anne, sweet. Latest—English Morello and Belle Magnifique, preserving; Olivet and late Duke, preserving and dessert.

PEACHES.—Early—Alexander and Hale's Early. Late Fall—Early Crawford and Early Charlotte.

FOR LOWER MAINLAND.

APPLES.—Late Summer—Yellow Transparent. Early Fall—Duchess of Oldenburgh. Fall—Wealthy and Blenheim Orange. Winter—Ribstone Pippin, Lemon Pippin, Salome, Maiden's Blush and Canada Reinette. Crabs—Hyslop and Martha.

PEARS.—Fall—Bartlett, Beurre Boussock and Dr. Jules' Guyot. Late Fall—Beurre Clairgeau and Beurre Hardy.

PLUMS.—Early—Clyman. Late—Grand Duke and Monarch.

PRUNES.—German, Italian and Giant.

PEACHES.—Early—Alexander and Hale's Early. Late Fall—Early Crawford and Early Charlotte.

CHERRIES.—Early—May Duke and Black Tartarian. Later—Royal Anne and Windsor. Latest—English Morello, Olivet, Belle Magnifique and Late Duke.

FOR UPPER COUNTRY.

APPLES.—Early—California Astrachan. Early Fall—Duchess of Oldenburgh. Late Fall—Gravenstein and Snow. Early Winter—Blenheim Orange, Ribstone Pippin and Fall Pippin. Winter—Vandevere—Blue Pearmain and King of Tompkins County. Late Winter—Ben Davis, Red Cheek Pippin and Golden Russet. Crabs—Hyslop and Transcendent.

PEARS.—Fall—Flemish Beauty, Bartlett and Beurre Boussock. Late Fall—Louise Bonne de Jersey. Early Winter—Beurre Clairgeau and Winter Nelis.

PLUMS.—Early—Peach Plum. Mid-season—Black Diamond and Monarch. Late—Pond's Seedling, Yellow Egg and Coe's Golden Drop.

PRUNES.—Italian.

GRAPES.—Concord, Moore's Diamond, Niagara, Chasselas, Sweet Water and Neuchatel.

CHERRIES.—Early—Black Tartarian. Later—Royal Anne. Latest—English Morello, Belle Magnifique, Olivet and Late Duke.

PEACHES—Early—Alexander and Hall's Early. Mid-season—Early Crawford and Early Charlotte.

The following, by Geo. C. Atwood, in "Country Gentleman," is as applicable to the purchasers of trees, and to nurserymen and agents, in Canada as in the United States;—

"Good Advice to the Buyers of Trees.

"The agricultural papers for October are repeating their perennial complaints against the 'tree agents,' and nearly every instance mentioned says that the 'victim' bought, as he supposed, valuable varieties, and after they came into bearing they proved to be nothing but scrubs or inferior seedlings—sour apples should have been sweet, red currants white, etc.

"Now, we have much sympathy for the grower who waits for years to get his trees into bearing, only to find that he has been victimized. Such experiences are disappointing, and in some cases attended with serious loss. The ease with which a label may be changed from one tree to another, and the long time it takes for a tree to bear, are inviting to an unscrupulous agent, and some fall into the temptation.

"The majority of trees raised in the State of New York are grown by honourable and responsible nurserymen—men who know their business, and who keep their varieties 'true to name.' Some of these nurserymen employ agents to sell their trees, and are responsible for the acts of those agents. If a stranger calls on you to sell you trees, do not believe anything he says unless he proves it. If he claims to be 'one of the proprietors' of a nursery, take his references and write to them. If he says he is a 'special' or 'general' agent, he can show a certificate of his agency, and you are to see that it is of recent date. If you make a purchase, have him give you a duplicate of the order, and see that it is correct and that it has his name written thereon, and then write to the firm who sent him to you, giving a full account of the transaction, and they will acknowledge it.

"Any one who buys trees should be as cautious about it as if he were buying any other commodity. Satisfy yourself that you are dealing with reliable, established and responsible nurserymen or their accredited agents. Plant freely of varieties of established value, invest but little in new things until you have tested them on your own land, and avoid all purchases of varieties when unreasonable claims are made for them."

In addition to the above, purchasers of nursery stock are reminded that all nursery stock from any point outside of the Province must be inspected by a quarantine officer of the Board, and the fees paid, before it is allowed to be removed, and this point should be clearly understood when ordering from nurserymen or their agents.

Planting Tables.

From the Horticulturists' Rule Book (Bailey).

				Plants.
15 feet	x	60 feet		48
18	″	18	″	134
18	″	20	″	121
18	″	24	″	100
18	″	30	″	80
18	″	36	″	67
18	″	42	″	57
18	″	48	″	50
18	″	54	″	44
18	″	60	″	40
20	″	20	″	108
20	″	24	″	90
20	″	30	″	72
20	″	36	″	60
20	″	42	″	51
20	″	48	″	45
20	″	54	″	40
20	″	60	″	36

	Plants.
24 feet x 24 feet	75
24 " 30 "	60
24 " 36 "	50
24 " 52 "	43
24 " 48 "	37
24 " 54 "	33
24 " 60 "	30
30 " 30 "	48
30 " 36 "	40
30 " 42 "	34
30 " 48 "	30
30 " 54 "	26
30 " 60 "	24
36 " 36 "	33
36 " 42 "	28
36 " 48 "	25

RULE.

To find the number of plants required to set an acre, multiply together the two distances, in feet, at which the trees stand apart, and divide 43,560 by the product; the quotient will be the number of plants required.

Quincunx Planting.—To find the number of plants required to set an acre by the quincunx method, ascertain from the above tables the number required at the given rectangular distances, and then increase the number by one-half.

Waxes for Grafting and for Wounds.

1.—COMMON RESIN AND BEESWAX WAXES.

1. *Reliable Wax.*—Resin, 4 parts by weight; beeswax, 2 parts; tallow, 1 part. Melt together and pour into a pail of cold water. Then grease the hands and pull the wax until it is nearly white. One of the best waxes, either for indoor or outdoor use.

2. Resin, 4 pounds; beeswax, 1 pound; tallow, 1 pound.

3. Resin, 6 pounds; beeswax, 2 pounds; linseed oil, 1 pint.

4. 6 pounds resin, 1 pound beeswax, and 1 pint linseed oil; apply hot with a brush, $\frac{1}{8}$ of an inch thick over all the joints.

5. For warm weather; 4 pounds of resin, 1 pound of beeswax, and from half to a pint of raw linseed oil; melt all together gradually, and turn into water and pull. The linseed oil should be entirely free from cotton-seed oil.

6. Resin, 6 parts; beeswax, 1 part; tallow, 1 part. To be used warm, in the house.

7. Resin, 4 or 5 parts; beeswax, $1\frac{1}{2}$ to 2 parts; linseed oil, 1 to $1\frac{1}{2}$ parts. For outdoor work.

2.—ALCOHOLIC WAXES.

8. *Lefort's Liquid Grafting-wax, or Alcoholic Plastic.*—Best white resin, 1 pound; beef tallow, 1 ounce; remove from the fire and add 8 ounces of alcohol. Keep in closed bottles or cans.

9. *Alcoholic Plastic with Beeswax.*—Melt 6 parts white resin with 1 part beeswax; remove from stove and partially cool by stirring, then add gradually—with continued stirring—enough alcohol to make the mixture, when cool, of the consistency of porridge. In the temperature of the grafting-room it will remain sufficiently plastic to permit applying to the cut surfaces with the finger.

10. *Alcoholic Plastic with Turpentine.*—Best white resin, 1 pound; beef tallow, 1 ounce; turpentine, 1 teaspoonful; add enough alcohol (13 to 15 fluid ounces of 95 per cent. alcohol) to make the wax of the consistency of honey. Or, less alcohol may be added if the wax is to be used with the fingers.

3.—FRENCH AND PITCH WAXES.

11. *Common French.*—Pitch, ½ pound; beeswax, ½ pound; cow-dung, 1 pound. Boil together, melt, and apply with a brush.

12. *Common French Bandage Wax.*—Equal parts of beeswax, turpentine and resin. While warm, spread on strips of coarse cotton or strong paper.

13. *Grafting Clay.*—⅓ cow-dung, free from straw, and ⅔ clay, or clayey loam, with a little hair, like that used in plaster, to prevent its cracking. Beat and temper it for two or three days until it is thoroughly incorporated. When used it should be of such consistency as to be easily put on and shaped with the hands.

14. 2 pounds 12 ounces of resin and 1 pound 11 ounces of Burgundy pitch. At the same time melt 9 ounces of tallow; pour the latter into the former, while both are hot, and stir the mixture thoroughly. Then add 18 ounces of red ochre, dropping it in gradually and stirring the mixture at the same time.

15. Black pitch, 28 parts; Burgundy pitch, 28 parts; beeswax, 16 parts; grease, 14 parts; yellow ochre, 14 parts.

16. Black pitch, 28 pounds; Burgundy pitch, 28 pounds; yellow wax, 16 pounds; suet or tallow, 14 pounds; sifted ashes, 14 pounds. When used, warm sufficiently to make it liquid.

17. Melt together 1¼ pounds of clear resin and ¾ pound of white pitch. At the same time melt ¼ pound of tallow. Pour the melted tallow into the first mixture, and stir vigorously. Then, before the stuff cools, add, slowly stirring meantime, ½ pound of Venetian red. This may be used warm or cold.

4.—WAXED STRING AND BANDAGE.

18. *Waxed string for Root-grafting.*—Into a kettle of melted wax place balls of No. 18 knitting-cotton. Turn the balls frequently, and in five minutes they will be thoroughly saturated, when they are dried and put away for future use.

This material is strong enough, and at the same time breaks so easily as not to injure the hands. Any of the resin and beeswax waxes may be used. When the string is used it should be warm enough to stick without tying.

19. *Waxed Cloth.*—Old calico or thin muslin is rolled on a stick and placed in melted wax. When saturated it is allowed to cool by being unrolled on a bench. It is then cut in strips to suit.

5.—WAXES FOR WOUNDS.

20. Any of the more adhesive grafting-waxes are excellent for dressing wounds, although most of them cleave off after the first year. Stiff and ochreous paints are also good. Tar is useful.

21. *Coal-tar.*—Apply a coating of coal-tar to the wound, which has first been pared and smoothed. If the wound contains a hole, plug it with seasoned wood.

22. *Hoskins' Wax.*—Boil pine-tar slowely for three or four hours; add ½ pound of beeswax to a quart of the tar. Have ready some dry and finely-sifted clay, and when the mixture of tar and wax is partly cold, stir into the above-named quantity about 12 ounces of the clay; continue the stirring until the mixture is so stiff and so nearly cool that the clay will not settle. This is soft enough in mild weather to be easily applied with a knife or spatula.

23. *Schaefell's Healing Paint.*—Boil linseed oil (free from cotton-seed oil) one hour, with an ounce of litharge to each pint of oil; then stir in sifted wood ashes until the paint is of the proper consistency. Pare the bark until smooth, as the fuzzy edge left by the saw will cause it to die back. Paint the wound over in dry weather, and if the wound is very large cover with a gunny-sack.

24. *Tar for Bleeding in Vines.*—Add to tar about 3 or 4 times its weight of powdered slate, or some similar substance.

25. *Hot iron for Bleeding in Vines.*—Apply a hot iron to the bare surface until it is charred, and then rub into the charred surface a paste made of newly burnt lime and grease.

26. *Collodion for Bleeding in Vines.*—In some extreme cases two or three coats will be needed, in which case allow the collodion to form a film before applying another coat. Pharmaceutical collodion is better than photographic.

Cause of Unproductive Orchards.

The University of Illinois Experimental Station has done considerable work on orchard cultivation and management. In Bulletin 59 the following are given as some of the reasons why orchards in that State are unproductive, and which will apply in many cases to Canadian orchards:

FIRST.—Too many growers are expecting a crop to be given them without putting forth any efforts themselves after the trees have been set. The apple trees require the same careful attention as do other farm crops.

SECOND.—Lack of moisture is a common cause of failure to the apple grower in that State, especially in Southern Illinois. This is because grass and other crops are allowed to compete with the trees for the moisture supplied by rain. Water is just as essential to the apple tree on a hot summer's day as it is to the labourer in the harvest field.

THIRD.—Injuries resulting from the attacks of insects or of fungous diseases are a very common cause of failure. These depredators will probably always consider that they have as much right to the products of the farm as does the farmer himself. For this reason he must get his artillery and ammunition and fight the enemy.

FOURTH.—Lack of fertility is a very common cause of failure in southern, western and some sections of northern Illinois. The apple orchards cannot produce a profitable crop unless provided with an ample supply of nitrogen, potash and phosphoric acid.

FIFTH.—Some orchards in this State have been planted without any thought given to their adaptability to the particular soil or climate. Loss in apple-growing is often wholly a matter of varieties.

SEVENTH.—Trees propagated from unproductive stock have been responsible for many failures. Scions should be selected from bearing trees or those which have demonstrated their ability for productiveness.

EIGHTH.—Sterility as a result of planting an orchard of only one variety is a common cause of failure, in part at least. Cross fertilization is desirable with all fruits.

NINTH.—Excessive climatic conditions or the killing of the blossoms by frost, are oftentimes responsible for unproductiveness.

Keeping Fruits.

In recent experiments in England, according to the Journal of the Board of Agriculture, the storage chambers were fitted with tiers of galvanized wire shelves around the sides, and the fruit was placed on these under three different conditions: (1) exposed on the shelves; (2) enveloped in grease-proof paper; (3) surrounded by cotton wool.

It was found that strawberries could be kept for at least three weeks in a temperature of 30 degrees, but it was necessary to surround the fruit with cotton wool, or, in the case of fruit in sieves, to place a pad of that material over the top. When this precaution was not taken, the fruit, though sound, became dull and lost the fresh, inviting appearance which is so important when it is offered for sale. Black currants kept well for ten days, after which they began to shrivel, but plumped and freshened when exposed to the air so as to be marketable. This was especially the case with black currants that had been stored in the market sieves and covered with a wad of cotton wool. After a fortnight's storage, the temperature was raised from 30 degrees to 32 degrees F., and this seemed to give the best results. The experiments with red currants were an unqualified success, the fruit remaining perfectly sound for six weeks, and maintaining its freshness when exposed to a normal temperature for 16 hours. Cherries covered with wool kept for a month at a temperature of 30 degrees, and at 36 degrees were not only sound, sweet and juicy, but fresh and clear. After the fourth week the fruit began to wrinkle.

Green gages were kept in excellent condition for ten weeks, and Victoria plums kept for nine weeks, but the cooking varieties of plums, with that exception, did not lend themselves satisfactorily to cold storage.

Experiments were made by the Kansas station with winter fruit. Pears were kept from three to four months. They should be packed in bushel boxes, each specimen being wrapped separately if the quality will warrant it. The most favourable temperature for fall varieties, as shown in the tests, is 36 degrees to 38 degrees F., while winter varieties require a temperature of from 33 to 35 degrees. Winter Nelis from Kansas did not keep as long as the same variety from California, indicating that the climate has a stronger influence on the keeping qualities of fruits than the distance they are shipped, provided proper attention is paid to packing.

The Canada Experimental Farms made experiments to ascertain the best methods for storing apples for winter. The experiments began in autumn, and the final examination was made July 29th following.

Specimens wrapped in paper kept better than those not wrapped. There were few rotten apples, and they lost least by evaporation. The ground floor storeroom did not preserve them as well as the cellar. * * * A tight package preserved the fruit best in the store-room, but not in the cellar; per contra, a ventilated package did better in the cellar than the store-room.

A striking example of the possibilities of cold storage in the preservation of apples is furnished by the work of the Nebraska State Horticultural Society at the Trans-Mississippi Exposition of 1898. The fruit was gathered and put in cold storage during the fall of 1897, most of it during the month of October, though some not until December. Each apple was wrapped first in a sheet of waxed paper, using 9 x 12-inch sheets for large ones. Then another covering of common newspaper was added. This double wrapping made an air-tight cell for each apple, thus preventing any spread of decay. The fruit was then packed carefully in barrels, filling them up so as to require considerable pressure to get the heads in The temperature of the room in which they were stored did not vary over one degree from 35 degrees from the time they were placed in it until they were removed. A number of varieties were still in good condition on November 1st of the following year.

To determine how such double wrapping lengthens the period of keeping apples, a few barrels of unwrapped Ben Davis and Winesap apples were placed in the same storage room, at the same time, and received exactly the same treatment as the others. Seventy per cent. of them were decayed when taken out June 1st. Those remaining in firm condition were so badly discoloured and had lost their flavour to such an extent as to render them wholly unfit for either show or market. A few of the sample varieties were also wrapped in newspaper only. Of these about 30 per cent. were in very poor condition June 1st.—*V. A. Clark, in "Ice and Refrigeration."*

NORTH-WEST FRUIT GROWERS.

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An Account of the Meetings held at Portland, Oregon, 5th, 6th and 7th February, 1901.

(Colonist, 23rd February, 1901.)

Mr. J. R. Anderson, Deputy Minister of Agriculture, returned on Monday from attending the annual convention of the North-West Fruit Growers' Association in Portland, and visiting the agricultural colleges in the States adjoining British Columbia, and makes a most satisfactory report of his reception and the work done.

The meeting of the North-West Fruit Growers' Association occupied Tuesday, Wednesday and Thursday, the 5th, 6th and 7th of February, there being three sessions, viz., morning, afternoon and evening, on the first two days, and morning and afternoon sessions on the last day. The large room of the A. O. U. W. Hall, corner of Second and Taylor streets, where the convention was held, was filled at all the sessions with delegates from Oregon, Washington, Idaho and British Columbia, representatives of the various railroad companies, shipping firms and commission men, and Mr. H. E. Van Deman, United States Pomologist, all of whom took a lively interest in the proceedings. Thursday, sessions were devoted to routine work, reports of committees, papers on various matters relating to horticulture and discussions; the evening sessions were varied by addresses, instrumental music furnished by local talent, and by vocal music by Mrs. Walter Reid and Miss Gamble. The business transacted embraced every phase of horticulture, the production of fruit, varieties, markets, transportation, packing, packages, horticultural inspection, birds and other matters.

The opening session, Tuesday, February 5th, was chiefly of a formal character. President Blalock, Vice-Presidents E. L. Smith, F. L. Wheeler and L. A. Porter, J. R. Anderson, of Victoria, and Prof. Miliken, of Idaho, made short reports of the fruit conditions in the different portions of the North-West. H. E. Van Deman spoke briefly on the subject of the Pan-American Exposition. A Committee was appointed to draft a memorial on the subject, addressed to the Legislatures of the States included in the Association. At the opening of the afternoon session, the Committee reported the following memorial, which was unanimously adopted:

"Your memorialists, the North-West Fruit Growers' Association, composed of representative fruit growers of the States of Oregon, Washington, Idaho, Montana and the Province of British Columbia, in convention assembled, at the City of Portland, Oregon, do hereby earnestly but respectfully petition our respective Legislatures to make adequate appropriation for the representation of the products of the territory embraced in this Association at the Pan-American Exposition at Buffalo, N. Y."

It is impossible to give all the addresses which were made, but the following remarks are worthy of consideration:

H. E. Van Deman said, regarding apples, that we cannot generalize upon the matter of varieties, but there are a number of national importance. The Ben Davis is one of these, and is to-day the business apple of America. If he were living in the North-West, however, he did not know whether he would plant any Ben Davis trees, but he would plant Rome Beauty, and probably Jonathan; perhaps also Grimes' Golden, an apple of the highest quality, the only objection to which is that it is not red. The Gano is a variety worth testing. Its origin is not really known, although the tree is known from which the variety has been propagated. It is substantially a Ben Davis of deeper colour, and possibly better quality. The Black Ben Davis and the Gano are identical, or so similar that it is not worth while to pay more for a tree of one variety than for one of the other. He would plant apple trees 33 to 40 feet apart, but would put in fillers between them of varieties which would come into bearing very early, such as Wagener. The only objection to this method is that the average orchardist will not cut out the fillers soon enough.

Mr. Van Deman referred also to the wonderful success which Mr. Roland Morrill, of Michigan, has made in raising and selling peaches. Mr. Morrill now does not allow peaches to grow on the trees closer together than ten inches. Mr. Hale has increased his distance for peaches up to eight inches apart. In this country there is great need of thinning out the trees in the orchards.

The Ben Davis then received attention from a number of growers, and Mr. E. L. Smith said that in selling Ben Davis apples the growers are not giving the public a fair deal. Mr. L. A. Porter said he had shipped 65,000 boxes of apples this year, but he could not sell Ben Davis as long as he had any other varieties for sale.

The box question is one that has given the fruit growers of the neighbouring States as much trouble and vexation as it has given those of this Province.

Mr. Anderson brought up the question for discussion, pointing out the expediency of a uniform-sized package being adopted for apples. The box recommended by the Board of Horticulture of this Province was of the following dimensions, viz.: 10 x 11 x 20½ inches inside measurement, having a cubic capacity of 2,255 inches. The Board was, however, not wedded to their recommendation, and in any case the shape of this box was not suitable for up-country growers. A long discussion ensued, and a Committee was eventually appointed, who brought in the following report, and which was adopted, viz.:—

"*Mr. President:* Your Committee to whom was referred the matter of uniform apple packages, respectfully recommend that the apple boxes of this Association shall be of the following dimensions, inside measurement, viz.: 18 inches length, 11½ inches width, 10½ inches deep, containing 2,173 cubic inches, and to be known as 'Standard.' We further recommend the following size, to be known as 'Special': Length, 20 inches; width, 11 inches; depth, 10 inches, and that the ends of said boxes be ⅞ of an inch in thickness. We also further recommend that all former actions of this Association relative to apple boxes be repealed. The above is most respectfully submitted."

The measurements are on the inside, and it will therefore be seen that the special box, having a cubic capacity of 2,220 inches, is nearly the same as that recommended by the Board of Horticulture. The following are some of the matters of interest touched upon:—

A communication was received from the Idaho State Horticultural Society, asking for the appointment of a joint committee for the discussion of the fruit conditions in the North-West, including methods of marketing and how to maintain prices. The matter was referred to a committee consisting of the Vice-Presidents, representing Oregon, Washington, Idaho, Montana and British Columbia.

At the evening session, Mayor Rowe, of the City of Portland, delivered an address of welcome, to which President Blalock, the several Vice-Presidents, and Mr. J. R. Anderson, Deputy Minister of Agriculture for the Province of British Columbia, made fitting responses. Very choice music was provided. The principal feature of the meeting was a paper by Dr. J. R. Cardwell, on the subject, "Experience, a Dear School."

The matter of selecting the place for the next meeting then came up. There was a lively competition for the honour, and the matter had to be settled by ballot. Walla Walla won by a clear majority.

Officers were elected for the ensuing year as follows: President, Dr. N. G. Blalock, of Walla Walla, Washington; Vice-Presidents, for Oregon, E. L. Smith, of Hood River; for Washington, Frank L. Wheeler, of North Yakima; for Idaho, L. A. Porter, of Lewiston; for Montana, S. M. Smery, of Bozeman; for British Columbia, J. R. Anderson, of Victoria; Secretary, C. F. Vandewater, of Walla Walla, Washington; Treasurer, W. S. Offner, of Walla Walla, Washington.

At the last evening session, Prof. Cordley read a paper on "Horticultural Inspection." He traced the history of the San Jose scale and of the state legislation against insect pests and plant diseases, which followed as a result of the ravages of this scale. While these laws have not eradicated or wholly prevented the spread of such pests, they have proved of much value, and horticultural inspection is becoming increasingly useful.

Mr. Anderson said there was very little difference between the climatic conditions of Oregon and British Columbia. By a rigid enforcement of their laws for the inspection of fruits and fruit trees, they have been so fortunate as to so far prevent the introduction in that Province of the two most dreaded pests, the San Jose scale and the codling moth. They enforced their laws against Canadian fruit with exactly the same rigour as against those from the United States.

The meeting concluded with an address by Professor E. R. Lake, upon his observations on orchards and the fruit business in France, illustrated by views taken by him while in that country. The address was listened to with much interest by the large audience.

As on the previous evening, the audience was entertained by very fine music, which reflected credit upon Secretary Dosch's musical taste, as the matter of providing music was left wholly to him.

Mr. Anderson cannot sufficiently express his appreciation to Dr. Blalock, the re-elected president for the seventh time; Mr. H. E. Dosch, the retiring secretary, and all others with whom he came in contact at the meeting, for the courteousness and attention shown him during his sojourn in Portland.

Mr. Dosch, who is secretary for the Board of Horticulture, has a good office on Washington street, where a fine permanent exhibition of fruits, grains, grasses and other products is kept, affording a good object lesson to intending settlers. He has also stuffed specimens of useful and other birds, and specimens of woods and minerals.

After the adjournment of the North-West Fruit Growers' Convention, Mr. Anderson visited the Agricultural Colleges at Pullman, Wash.; Moscow, Idaho; and Corvallis, Oregon, in order to carry out some recommendations of the Central Farmers' Institute, and to study the methods and course of studies pursued. With all these establishments Mr. Anderson made arrangements for such of the professors as could be spared to visit the Province and give addresses and lectures at Farmers' Institute meetings, and in exchange to reciprocate, if required. Arrangements were also entered upon by which a sufficient number of such publications issued by the college as may be suited to British Columbia wants can be obtained at cost price.

In the matter of students from this Province, the Washington College, Pullman, makes a charge of $10 a term, there being two terms in the year, of eighteen and a half weeks each. Board costs about $2.75 per week, and rooms from $10 to $12 per half year.

Pullman is reached by the Oregon Railroad & Navigation Company's railway from Portland, and the Northern Pacific from Seattle. The college buildings stand on a hill, which on the side next to the town is quite steep. A good view of the surrounding country is obtained from the Administration building. The country presents much the same appearance as that about Kamloops, viz., rolling hills, with scattered yellow pines here and there. It, however, differs from British Columbia's dry belt in that it has a sufficient rainfall to ensure the successful production of crops without irrigation; the hills are therefore cultivated right up to the tops, and large quantities of grain are produced. The land belonging to the station is quite extensive, and farming operations are therefore carried on in a practical manner. Prof. E. A. Bryan is the director, and he is ably assisted by a large and efficient staff, amongst whom are Professors Spillman and Piper, both of whom are well known in this Province. Prof. Spillman was exceedingly kind in showing Mr. Anderson everything of interest connected with the college and farm. The attendance is about 450 of both sexes, the young men predominating.

At the Idaho State University and Agricultural College, Moscow, students from this Province will be accepted free, the other charges being about the same as at Pullman. The college consists of a single large and handsome structure, standing on well-kept grounds, and is about a mile from the centre of the town, on rising ground. It is anticipated that a sufficient appropriation will be made this year to provide additional and necessary buildings. The land belonging to the station is limited, but sufficient, nevertheless, to enable practical farming to be carried on. Prof. French kindly took Mr. Anderson over the grounds and showed him some fine stock, amongst which were some fine specimens of the milking strain of Shorthorns. Some of these animals are to be sent to Japan. The president and director is Prof. James A. McLean, and he has a large and efficient staff of assistants. The country in the vicinity is of the same character as that at Pullman.

At the Oregon State Agricultural College, Corvallis, students will also be accepted free; board and lodging costs $12 per month in town and $10 per month at the college. Uniforms, which the male students wear, cost $16; this last item, however, can scarcely be classed as an extra expense, inasmuch as other clothes are not required. Corvallis is about 100 miles from Portland, and is reached by the Southern Pacific Railroad. The college buildings stand on an eminence about three-quarters of a mile from the centre of the town. The president and director is Prof. Thomas M. Gatch, and the vice-president Dr. James Withycombe, the latter being well known amongst some of our people, he having lectured at some Institute meetings in the Province. There are besides a large staff of instructors, amongst whom is E. C. Hayward, assistant professor of mechanical and electrical engineering, a son of Mayor Hayward of Victoria, and who seems to be quite a favourite amongst his coadjutors. The lands belonging to this college are extensive, and farming operations are carried on extensively. Dr. Withycombe, in spite of the serious illness of his wife, was very attentive in showing Mr. Anderson over the farm and grounds, all of which he found greatly improved since his last visit, six years ago. But two of the instructors, however, who were at the college at that time are there now, viz., Margaret C. Snell, M. D., professor of household science and hygiene, and George Coote, professor of floriculture and gardening. After chapel, Mr. Anderson was asked to address the students, who number between 400 and 500, about one-third of whom are girls. He therefore gave a short address, which was well received. The country hereabouts reminds one of that in the vicinity of Victoria—a good deal of open land, interspersed with belts of oak and fir trees. The orchards are some of the oldest in the State, but owing to lack of drainage and care, many of the trees are covered with moss, which hangs in long festoons from the branches. This remark does not, however, by any means apply to all.

The course of studies are about alike at all the colleges, and embrace all the sciences, trades and occupations, besides practical instruction in farming, chemistry, engineering, civil engineering, botany, horticulture, military drill, ironwork, woodwork, assaying, household economy, sewing, etc.

Mr. Anderson expresses his great admiration for the enlightened policy of the railroad companies operating in the adjoining States, notably that of the Oregon Railroad & Navigation Company. This company has a department whose duties are altogether devoted to the exploiting of the agricultural resources of the States alluded to. Col. Judson, under whose superintendence the experiments are carried on, is a most enthusiastic and intelligent man, and is ready at all times to give all facilities and information to anyone interested. A large experimental station is maintained by the Company at Walla Walla, to which Mr. Anderson was invited to go on his arrival in Portland, but which, on account of fatigue, he had to decline. The company not only transports lecturers free of charge—and this remark applies to all the transportation companies—but it actually engages lecturers on its own account to address Farmers' Institutes. Col. Judson extracted a promise, which was given conditionally by Mr. Anderson, that he should come over in May, when the Secretary of Agriculture of the United States will visit the experimental station and make a thorough inspection of the methods. An exchange of seed grain was arranged with Col. Judson; he has a good display of grain and photos of experiments conducted. "My thanks," says Mr. Anderson, "are due to Col. Judson and all the other railway officials in Portland, for courtesies extended."

Dr. Withycombe, of Corvallis, has promised to send Mr. Anderson a quantity of the seed of Dwarf Essex Rape which he raised on the farm, and therefore guarantees as good. This will be distributed, when it arrives, to anyone applying for it. It is the crop par excellence of all others as a soiling crop, and is unsurpassed for feeding sheep.

As to the production of grapes, Rev. O. W. Taylor, of The Dalles, informed Mr. Anderson that he sold 190 tons off 25 acres, realising $7,000 gross. The varieties he cultivates comprise Muscatels, Black Hamburg, Rose of Peru, Tokay and all the well-known Californian and other varieties. The average temperature in winter is 26 degrees, and the coldest is 4 below zero. Why cannot some of our people emulate his example? Many parts of the Province are equally well adapted for grape growing. Mr. Taylor will be pleased to supply cuttings to anyone desiring them.

INSECTICIDES.

Horticulturists' Rule Book (Bailey).

The results obtained from the use of any insecticide or fungicide depends upon the operator. Timeliness, thoroughness and persistence are the watchwords of success. It is easier to keep an enemy away than to drive him away. The worst foes are often the smallest ones, and the injury is often done before they are detected. Be ready, and begin early.

Insecticides are of three general types: liquid spray, powder, and fumes of vapour.

Arsenic.—Known to chemists as arsenious acid, or white oxide of arsenic. It is considered an unsafe insecticide, as its colour allows it to be mistaken for other substances, but, in its various compounds, it forms our best insecticides. From 1 to 2 grains, or less, usually proves fatal to an adult, 30 grains will usually kill a horse, 10 grains a cow, and 1 grain or less is usually fatal to a dog. In case of poisoning, while awaiting the arrival of a physician, give emetics, and after free vomiting give milk and eggs. Sugar and magnesia in milk is useful.

White arsenic, when applied in solution to foliage, is injurious. The poison can be used with lime, however, if treated as follows: Boil 1 pound of arsenic and 2 pounds of lime in 3 or 4 gallons of water for half an hour. The sediment, an arsenite of lime, can then be used in about 100 gallons of water, with good results.

Arsenites.—A term popularly used for compounds of arsenic. The leading arsenites used in destroying insects are Paris green and London purple.

Arsenate of Lead.—This compound of arsenic has recently come into use, and it promises to be of much value. It was first suggested by F. C. Moulton, in 1892, and has since been tested in the extermination of the Gipsy-moth in Massachusetts. When used at the rate of 2 pounds in 150 gallons of water, it was effective in destroying the larvæ of the moths, while the foliage of apple trees was uninjured when the poison was used at the rate of 24 pounds in 150 gallons of water. The arsenate of lead may be prepared by dissolving 11 ounces of acetate of lead in one vessel, and 4 ounces of arsenate of soda in another. When these two solutions are mixed, there is formed a fine white powder, which is sufficient for 150 gallons of water.

London Purple.—An arsenite of lime, obtained as a by-product in the manufacture of anniline dyes. The composition is variable. The amount of arsenic varies from 30 to over 50 per cent. The two following analyses show its composition:—1. Arsenic, 43.65 per cent.; rose anniline, 12.46; lime, 21.82; insoluble residue, 14.57; iron oxide, 1.16; and water, 2.27. 2. Arsenic, 55.35 per cent.; lime, 26.23; sulphuric acid, 0.22; carbonic acid, 0.27; moisture, 5.29. It is a finer powder than Paris green, and therefore remains longer in suspension in water. It is used in the same manner as Paris green, but is sometimes found to be more caustic on foliage. This injury is due to the presence of much soluble arsenic, but it can be averted by the use of lime, as advised under Paris green.

Paris Green.—An aceto-arsenite of copper. When pure, it contains about 58 per cent. of arsenic, but the commercial article usually contains less, often as little as 30 per cent., and rarely none. The following may be considered an average analysis:—Arsenic, 47.68 per cent.; copper oxide, 27.47; sulphuric acid, 7.16; moisture, 1.35; insoluble residue, 2.34. It is applied in either a wet or dry condition, but in any case it must be diluted. For making a dry mixture, plaster, flour, air-slaked lime, road dust, or sifted wood ashes may be used. The strength of the mixture required depends upon the plants and insects to which it is to be applied. The strongest dry mixture now recommended is 1 part of poison to 50 of the diluent, but if the mixing is very thoroughly done, 1 part to 100, or even 200, is sufficient.

Paris green is practically insoluble in water. When mixed with water, the mixture must be kept in a constant state of agitation, else the poison will settle, and the liquid from the bottom of the cask will be so strong as to do serious damage, while that from the top will be useless. For potatoes, apple trees, and most species of shade trees, 1 pound of poison to 200 or 250 gallons of water is a good mixture. For the stone fruits, 1 pound to 300, or even 350, gallons of water is a strong enough mixture. Peach trees are very apt to be injured by arsenites; and for them the mixture should be no stronger than 1 pound to 300 gallons. In all cases, the liquid should be applied with force, in a very fine spray. At some seasons of the year, foliage is more liable to injury than at others. The addition of a little lime (twice the bulk of lime as of Paris green) to the mixture, will prevent any caustic injury upon the foliage.

Spraying with Paris green or London purple does not endanger stock pastured in the orchard.

Combinations of Arsenites and Fungicides.—The arsenites may be used in connection with some fungicides, and both insects and plant diseases in this manner may be combated at the same time. The arsenites may be added to Bordeaux mixture in the same proportion as if the Bordeaux were plain water. The arsenites are also sometimes added to soap and other washes.

The addition of lime to Paris green and London purple mixtures greatly lessens injury to foliage, and, as a consequence, they can be applied several times stronger than ordinarily used, if they are combined with the Bordeaux mixture. The free lime in the mixture combines with the soluble arsenic, which is the material that injures the foliage, and the combination is thus made quite harmless.

London purple and Paris green should rarely be applied with the ammonical carbonate of copper, as the ammonia in the latter dissolves the arsenic, making the combination caustic. The addition of sulphate of copper to the arsenites also increases injury.

Bait.—Paris green or London purple, 1 ounce; chopped grass or leaves, 8 ounces; and enough syrup to allow the mass to be worked into balls, which are spread about the garden. For wire-worm beetles, crickets, katydids, etc.

2.—Bran, 40 pounds; middlings, 15 pounds; arsenic, 20 pounds; cheap syrup, 2 gallons. Mix in soft water to a paste. For grasshoppers and cut-worms.

Benzine.—Sometimes used to kill weevils and other insects in dry peas, corn and grain. Less useful than bisulphide of carbon.

Bisulphide of Carbon.—A thin liquid which volatilizes at a very low temperature, the vapour being very destructive to animal life. It is exceedingly inflammable and should never be used near a lamp or fire. It is used for many root-insects. It is poured into a hole, which is immediately closed up, causing the fumes to permeate the soil in all directions. In loose soils it is very destructive to insects. It is also inserted in tight receptacles to kill such insects as pea-weevil and museum pests, where a teasponful is sufficient for a receptacle holding 2 or 3 gallons. It may also be used for mites and mealy-bugs on live plants. For this purpose, the plant is covered with a tight receptacle, and 1 fluid dram (60 drops or minims) is sufficient for a space equal to about 6 to 8 cubic feet.

Bisulphide of Carbon and Kerosene —One part of bisulphide of carbon mixed with from 5 to 20 parts of kerosene will produce vapour sufficient to kill many grain-eating insects.

Burning.—Larvæ which live or feed in webs, like the tent caterpillar and fall web-worm, may be burned with a torch. The lamp or torch used in campaign parades finds its most efficient use here.

Carbolic Acid and Soap Mixtures.—One pint crude carbolic acid; 1 quart soft soap; 2 gallons hot water. Mix thoroughly. This wash is used for borers, and for scale-insects. Apply with cloth or soft broom. Use only on dormant wood.

Carbolic Acid and Water.—Add 1 part of acid to from 50 to 100 parts of water. For root-insects.

Carbolic Acid Emulsion.—One pound hard soap or 1 quart soft soap dissolved in 1 gallon boiling water, and add 1 pint of crude carbolic acid, and emulsify by agitation. One part is used in 30 parts of water for cabbage-maggots and other root-insects.

Carbolized Plaster.—Stir 1 pint of crude carbolic acid into 50 pounds of land plaster; or quicklime may be slaked with the acid. The powder is thrown over the tree when the dew is on, as a remedy for the curculio. It should be applied profusely. This is used by some peach and plum growers for the curculio, with apparent success, but it is of doubtful efficiency.

Carbon Bisulphide.—*See* Bisulphide of Carbon.

Cement Wash.—Five tablespoonfuls hydraulic cement to 1 gallon sour milk or butter-milk. Mix, and apply at once to base of peach trees as remedy for borer. (N. Carolina Experiment Station.)

Coal-tar Fumes.—Burn rags coated with coal-tar attached to a pole. Remedy for aphis, but little used.

Copperas (*Sulphate of Iron.*)—One ounce of copperas to a pail of water is sometimes effective in destroying root-insects. Little used except when forming a saturated solution, to which may be added about 1 % of sulphuric acid. This is a standard remedy against grape anthracnose in Europe, in winter.

Corrosive Sublimate Wash.—Dissolve 1 ounce corrosive sublimate in 1 pint alcohol; stir in 10 gallons soft soap, and add water to make a stiff paint. Apply to base of trees with brush for borers and woolly root-louse. (Recommended by N. Carolina Experiment Station.)

Fumigation.—Fumigating, or "smoking," or "smudging," in greenhouses is performed by the slow burning of tobacco stems. Best results are obtained when a sheet-iron vessel made for the purpose is used, having holes in the bottom to supply draft. A quart of live coals is placed in the bottom of the vessel, and about a pailful of tobacco stems is laid on them. The stems should not blaze, but burn with a slow smudge. If they are slightly damp, better results are obtained. Some plants are injured by a very heavy smoke, and in order to avoid this injury, and also to more effectually destroy the insects, it is better to smoke rather lightly and often. It is also well to smoke on two consecutive days, for the insects which persist through the first treatment, being weak, will be killed by the second. If the plants are wet, the smoke is more likely to scorch them. The smudge often injures flowers, as those of roses and chrysanthemums. In order to avoid this injury, the flowers should be covered with paper bags. For aphids (green-fly or plant lice). *See* Tobacco.

Gas (Hydrocanic), for Scale-Insects.—Three oz. water, 1 fl. oz. sulphuric acid, 1 oz. 60 % cyanide potassium. Gas arising (very poisonous) is sufficient for covered space of 150 cubic feet. For dormant trees. Expose one hour.

Glue and Arsenites Wash.—Common glue, 1 pound, soaked a few hours in cold water and then dissolved in ½ gallon of hot water; add 1 oz. Paris green, stir well, and add hot water till the mixture measures 2 gallons. For preventing the attacks of borers. Recommended in various writings, but to be used with great caution, if at all. If applied in the growing season, or more than once, especially upon young trees, it is apt to kill the bark. If the Paris green contains soluble arsenic, much harm may be expected to result.

Hellebore.—See White Hellebore.

Hot Water.—Submerge affected plants or branches in water at a temperature of about 125°. It will also kill rose bugs at a temperature of 125° to 135°.

Kerosene.—In pure state, kerosene has been used as an insecticide upon many plants, with various results. It does not appear to injure the coleus, grape, peach and pea, but does injure the potato, tomato and gooseberry and other plants. It is not to be recommended unless in the form of emulsion, however, or much diluted.

Under the name of paraffine oil, it is used in England as follows:—When plants are infested with lice, wet them at intervals of three or four days for about three weeks with diluted paraffine in the proportion of a wineglassful to watering-can of water.

Kerosene Emulsion.—1. Cook's emulsion: Soft soap, 1 quart, or hard soap—preferably whale oil soap—¼ pound; 2 quarts of hot water; 1 pint kerosene. Stir until all are permanently mixed, and then dilute with water to one-half or one-third strength. A good way to make the emulsion permanent is to pump the mixture back into the receptacle several times. Makes a permanent emulsion with either hard or soft water.

2. The Hubbard-Riley or standard emulsion: Hard soap, ½ pound; boiling soft water, 1 gallon; kerosene, 2 gallons. Churn or pump the ingredients vigorously 15 or 20 minutes. Dilute 10 or more times when using.

Two ounces balsam of fir added to the above appears to increase its efficiency, and it causes it to adhere to foliage better. ½ pint spirits of turpentine is sometimes added.

3. Pyrethro-kerosene emulsion: In the place of pure kerosene in the above emulsions, use kerosene decoction of pyrethrum, made by filtering 1 gallon of kerosene through 2½ pounds of pyrethrum. Valuable.

Kerosene and Condensed Milk Emulsion.—Kerosene, 2 gallons, or 64 per cent. of the entire mixture; condensed milk, 4 cans of ¾ pint, or 12½ per cent.; water, twice the quantity of milk, or 25 per cent.

Kerosene and Milk Emulsion.—Sour milk, 1 gallon; kerosene oil, 2 gallons; warm to a blood heat and mix thoroughly. Dilute 10 times with water. For scale insects and plant-lice.

Kerosene and Water Emulsion.—Goff atomizes kerosene and water as follows: To the Woodason atomizing bellows a small cup is attached directly in front of the fount for holding the liquid to be atomized. From this cup a very slender copper tube is passed through the side of the fount, where it enters the larger tube that conducts the liquid from the fount to mouth of the bellows. It then curves upward, passing through the centre of this tube as far as the mouth of the bellows, where both come to an end at the same point. Kerosene is then placed in the added cup, and water in the fount. On working the bellows the liquids are atomized together. The proportion of kerosene emitted will depend upon the relative diameters of the two tubes, but it may also be regulated by the relative depths of the liquid in their respective founts. A better way would be to use but a single fount and to divide this into two parts, one for kerosene and the other for water. This would permit the mouth of the bellows to be brought nearer to the plant to be atomized.

The value of kerosene applied in this manner is not yet fully determined.

Lead, Arsenate of.—*See* under Arsenites.

Lime Spray.—Slake ½ peck or a peck of lime in a barrel of water, straining the lime as it enters the barrel to prevent its clogging the pump. Apply in a spray until the tree appears as if whitewashed. For rose-chafer.

London Purple.—*See* under Arsenites.

Lye Wash.—1 pound concentrated lye or potash 1¼ pounds, to 3 gallons water. On an average, 1 bushel of good wood ashes contains about 4 pounds of potash. For scale-insects.

Common home-made lye is often diluted with water and applied to apple branches with a brush as a remedy for bark-louse. It is also recommended as a remedy for the cabbage-worm, being sprinkled on the cabbages with a watering-pot. If concentrated lye is used, a pound should be diluted with a barrel of water.

Lye and Sulphur Wash.—Concentrated lye, 1 pound, or potash, 1¼ pounds; sulphur, 1½ pounds; water, 3 gallons. For scale-insects.

Lye and Whale-oil Soap Wash.—(*a.*) Dissolve 1 pound of concentrated lye in 1 gallon of water; add to this 1½ pounds of sulphur and boil until sulphur is dissolved. (*b.*) Dissolve 14 pounds of the best whale-oil soap in 54 gallons of water; add solution *a* to *b*, and boil for a short time. For scale; used as a summer wash when the first brood is hatching. Use at 130° Fahrenheit, thoroughly washing the trunks and larger branches and spraying the smaller branches and twigs.

Oil and Alkali Wash.—1. 1¼ gallons of whale oil; 25 pounds sal-soda; dissolve the sal-soda in 25 gallons of water and heat it to boiling. When boiling, pour the whale oil in. Apply wash when cooled to 130° Fahrenheit.

2. 1 pound of concentrated lye (American), of 80 per cent.; or 4/5 of a pound of Greenbank powered caustic soda, of 98 per cent.; or 1 pound of solid caustic soda, of 76 per cent.; or 1½ pounds of solid caustic soda, of 63 per cent. These varying proportions are given because the caustic sodas in the markets are of different strengths and purity. Whichever one is chosen, add to each amount named ½ pound of commercial potash and dissolve in 6 gallons of water.

Both washes are for scale-insects on deciduous trees in winter. (Californian.)

Paraffine Oil.—Essentially the same as kerosene, which see.

Paris Green.—*See* under Arsenites.

Persian Insect Powder.—*See* Pyrethrum.

Plaster and Kerosene.—2 quarts of plaster or wood ashes; 1 tablespoonful of kerosene. Mix, and rub with the hands until the oil is well incorporated. Bone-flour may be substituted for the plaster. Repellent; used mostly for flea-beetles and striped squash-beetles.

Plaster and Turpentine.—2 quarts common land plaster, 1 or 2 tablespoonfuls of turpentine, mixed and used as in the preceding.

Potash.—Kainit, 1 ounce to a pint of water, applied in a spray, is recommended for aphis and various leaf-eating larvæ. Muriate of potash, applied in same strength, is as good, but is more likely to injure the plants. Rarely used.

Potassic fertilizers have been recommended as insecticides against various ground insects.

Promoting Growth.—Any course that tends to promote vigour will be helpful in enabling plants to withstand the attacks of plant-lice and other insects.

Pyrethrum.—A very fine and light brown powder made from the flower-heads of species of pyrethrum. It is scarcely injurious to man. Three brands are upon the market.

Persian insect powder, made from the heads of *Pyrethrum roseum*, a species also cultivated as an ornamental plant. The plant is a native to the Caucasus region.

Dalmatian insect-powder, made from *Pyrethrum cinerariæfolium.*

Buchach, made in California from cultivated plants of *P. cinerariæfolium.*

When fresh and pure, all these brands appear to be equally valuable, but the home-grown product is usually considered most reliable. Pyrethrum soon loses its value when exposed to the air. It is used in various ways.

1. In solution in water, 1 ounce to 3 gallons.
2. Dry, without dilution. In this form it is excellent for thrips and lice on roses and other bushes. Apply when the bush is wet. Useful for aphis on house plants.
3. Dry, diluted with flour or any light and fine powder. The poison may be used in the proportion of 1 part to from 6 to 30 of the diluent.
4. In fumigation: It may be scattered directly upon coals, or made into small balls by wetting and moulding with the hands and then set upon coals. This is a desirable way of dealing with mosquitoes and flies.
5. In alcohol: (1.) Put 1 part of pyrethrum (buchach) and 4 parts alcohol, by weight, in any tight vessel. Shake occasionally, and after 8 days filter. Apply with an atomizer. Excellent for greenhouse pests. For some plants it needs to be diluted a little. (2.) Dissolve about 4 ounces of powder in one gill of alcohol and add 12 gallons of water.
6. Decoction: Whole flower-heads are treated to boiling water and the liquid is covered to prevent evaporation. Boiling the liquid destroys its value.
7. Water extract: Pour 2 quarts hot water through about a half pound of pyrethrum held in a coarse bag, and then add cold water enough to make 2 gallons, and it is well to stir in the powder itself. For aphis and cabbage-worms. It will keep but a few days. Or the extract can be made as follows:—Make a paste of 2 tablespoonfuls of pyrethrum by adding water. Stir this into 2 gallons of water and apply with a fine nozzle. This is recommended for the rose-chafer.
8. Pyrethro-kerosene emulsion. *See* under Kerosene Emulsion.

Good insect powder can be made from *pyrethrum roseum*, and probably also from *P. cinerariæfolium*, which are grown in the home garden.

Quassia.—Boil 4 ounces of quassia chips 10 minutes in a gallon of water; strain off the chips and add 4 ounces of soft soap, which should be stirred as it cools. Apply with syringe or brush. Ten or fifteen minutes after it has been applied give the plant a good syringing with clean water. For plant lice. Practically out of use in the United States.

Resin and Fish-oil Soap.—20 pounds of resin, 1 gallon of fish-oil, 8 pounds of caustic soda, and enough water to make 100 gallons. The caustic soda is first dissolved in about 16 gallons of water, after which one-half of the solution is taken out and the resin added to that remaining in the kettle. When all the resin is dissolved, the fish-oil is added to it and the whole thoroughly stirred, after which the balance of the caustic soda solution is added very slowly and boiled for about an hour, or until it will readily mix with water. Use an iron kettle. For scale insects on orange and olive. (Californian.)

Resin and Petroleum Soap.—Water, 100 gallons; resin, 17½ pounds; soda (60 per cent.), 7 pounds; fish-oil, 3 pounds; petroleum, 2 pounds. The resin, soda and fish-oil, with 20 gallons of water, are boiled together for four hours, when the kerosene is added and the whole is thoroughly stirred. While hot, place in a barrel and add the remaining 80 gallons of water, and emulsify by thoroughly stirring. For scale on citrous trees.

Resin Soap.—Ingredients for one barrel of 50 gallons: 10 pounds of caustic soda, 98 per cent.; 10 pounds potash; 40 pounds tallow; 40 pounds resin. First: Dissolve the potash and soda in 10 gallons of water. When dissolved, place the whole amount in the barrel to be used. Second: Dissolve the tallow and resin together. When dissolved, add the same to the potash and soda in the barrel, and stir well for five minutes or so. Leave standing for about two hours; then fill up with water, stirring well as every bucket of water goes in. Use the following day, 1 pound to the gallon of water. Apply warm. For scale on deciduous trees in summer. (Californian.)

Resin, Soda and Tallow Soap.—Resin, 2 pounds; caustic soda, 1 pound; tallow, 1 pound. Mix resin and soda, boil about 30 minutes, and then add tallow. For use, add 2 gallons of water to a pint. Used in spray for scale.

Rotation of crops is one of the readiest means of overcoming or escaping insect attacks. Even small fruit plantations can be rotated to advantage.

Salt and Lime Wash.—25 pounds of lime (unslaked), 20 pounds of sulphur, 15 pounds of salt, 60 gallons of water. To mix the above, take 10 pounds of lime, 20 pounds of sulphur and 20 gallons of water. Boil until the sulphur is thoroughly dissolved. Take the remainder —15 pounds of lime and 15 pounds of salt-slack—and add enough of water to make the whole 60 gallons. Strain and spray on the trees when milk warm, or somewhat warmer. This can be applied when the foliage is off the tree, and will have no injurious effects whatever on the fruit buds or the tree itself. For scale on deciduous trees in winter. (Californian).

Snuff.—Snuff may be used to kill plant lice upon house plants and in other places where fumigation or spraying cannot be employed. Blow it lightly on the plants. (*See* Sulphur and Snuff.)

Soap and Arsenites.—Soap, 4 pounds, which is dissolved in 1 gallon of hot water; add 4 ounces of London purple or Paris green, mix and dilute with 50 gallons of hot water. For various leaf-eating insects, but likely to injure tender foliage when the arsenite contains much soluble arsenic, unless lime is added.

Soap and Lime Wash.—5 pounds potash, 5 pounds lard stirred in 5 gallons of boiling water; 1 peck quicklime slaked in 5 gallons of boiling water, and mixed while hot with the potash and lard mixture. Dilute by adding 2 gallons of boiling water for each gallon of the mixture. It will keep indefinitely. Recommended for preventing the attacks of borers, but, like all washes for this purpose, of doubtful utility.

Soap and Soda Wash.—To soft soap add a strong solution of common washing soda until the mixture becomes a thick paint. Used for bark lice and other scale insects on the dormant wood.

Soap and Tobacco.—Dissolve 8 pounds of the best soft soap in 12 gallons of rain water, and when cold add 1 gallon of strong tobacco liquor. For plant lice.

Soap, Fish-oil.—Good potash lye, 1 pound; fish-oil, 3 pints; soft water, 3 gallons. Dissolve the lye in the water, and when brought to a boil add the oil. Boil about 2 hours. When cold, it can be cut into cakes. For use, put the soap in enough hot water to dissolve or cut it, and then add 6 to 10 gallons water to a pound of soap. For aphis.

Soda and Aloes.—Dissolve 2 pounds of washing-soda and 1 ounce of bitter Barbadoes aloes, and when cold add 1 gallon of water. Dip the plants into the solution and lay them on their sides for a short time, and the insects will drop off. Syringe the plants with clean, tepid water, and return to the house. For plant-lice.

Soda and Resin Wash.—Sal-soda, 3 pounds, added to 1 pint of hot water; add slowly 4 pounds of resin, and gradually add 2 pints of hot water; dilute to 5 gallons. For scale-insects; also recommended for curculio.

Soda and Whale-oil Soap Wash.—Dissolve 25 pounds sal-soda in 25 gallons water and heat to boiling, at which time add 1½ gallons whale-oil soap. Used as a winter wash for scale; apply at a temperature of about 130° Fahrenheit.

Soda Wash.—Dissolve ½ pound of common washing-soda in a pail of water. For scale and borers, on dormant wood.

Spraying.—A term applied to the application of liquid insecticides or fungicides, by means of a pump or syringe. *See* the various plants and materials for explicit directions, Spraying must be thoroughly and opportunely done, else it will fail.

Sulphide of Soda Wash (Hilgard's).—Dissolve 30 pounds of whale-oil soap in 60 gallons of water, by heating the two together thoroughly. Then boil 3 pounds of American concentrated lye with 6 pounds of sulphur and 2 gallons of water. When thoroughly dissolved, it is a dark, brown liquid, chemically called sulphide of soda. Mix the two—the soap and the sulphide—well, and allow them to boil half an hour. Then add about 90 gallons of water to the mixture, and it is ready for use. Apply it warm, by means of a spray-pump. Used warm, its effect is better and less material is required than when cold. For scale on deciduous trees in summer. (Californian.)

Sulphur.—Fumes of sulphur are destructive to insects, but should be carefully used or plants will be injured. The sulphur should be evaporated over an oil-stove, until the room is filled with the vapour. The sulphur should never be burned, as burning sulphur kills plants. For greenhouse use.

Sulphur and Snuff.—One pound of flour of sulphur, 1 pound of Scotch snuff, 1 pound of quicklime, ½ pound of lampblack, 1 pound of soft soap, with sufficient water to make them into the consistency of paint. Wash every branch, from the ground upwards, with a common paint brush, before the blossom-buds begin to swell. For plant lice.

Sulphur and Whale-oil Soap Wash.—Boil 1½ gallons of water, add ⅓ pounds of sulphur and boil fifteen minutes. To this add a pound of whale-oil soap, and boil for five minutes. Let stand for a week. When wanted for use, mix 1 pound of the compound to a gallon of water, and apply as a spray at a temperature of 130° Fahrenheit. Used for various burrowing larvæ, as the gooseberry fruit-worm and the currant-borer, as a repellent.

Tar is sometimes used to prevent the female and wingless canker-worm from ascending trees. The tar should be placed on cotton, or some material which will prevent it from coming in contact with the bark, and a band of the preparation is then placed around the trunk. Care must be taken to see that the tar does not injure the tree.

Tarred paper may be rolled loosely about trees to keep away mice, but it should be removed before warm weather. It is sometimes recommended as a preventive of the attacks of borers, but it very often injures trees, and should be used, if at all, with great caution.

Tobacco.—1. Stems, placed on the walks and under the benches of greenhouses, for plant lice. Renew it every month.

2. Tobacco-water, used with whale oil soap.

3. Dust. *See* Snuff.

4. Fumes. Burn dampened tobacco stems. *See* Fumigation.

5. Nicotyl. Steep tobacco stems in water and evaporate the water.

6. Tea, or common decoction. Boil the stems, or dust, thoroughly and strain; then add cold water until the decoction contains 2 gallons of liquid to 1 pound of tobacco.

There are various commercial preparations of tobacco for use in greenhouses.

Whale-oil Soap.—One pound whale-oil soap to 5 gallons of water. For mealy-bugs and similar insects. It will injure some tender plants.

White Arsenic.—*See* Arsenic.

White Hellebore.—A light, brown powder made from the roots of the white hellebore plant (*Veratrum album*), one of the lily family. It is applied both dry and in water. In the dry state it is usually applied without dilution, although the addition of a little flour will render it more adhesive. In water, 1 ounce of the poison is mixed with 3 gallons, and an ounce of glue, or thin flour paste, is sometimes added to make it adhere. A decoction is made by using boiling water in the same proportions. Hellebore soon loses its strength, and a fresh article should always be demanded. It is much less poisonous than the arsenites, and should be used in place of them upon ripening fruit. Used for various leaf-eating insects, particularly for the currant-worm and rose-slug.

SOILS AND FERTILIZERS.

As mentioned in my introductory remarks, the analyzing of soils, owing to lack of facilities, has not been done to the extent that is desirable or indeed necessary.

The following analyses and appurtenant remarks are by the courteous and obliging Chemist of the Central Experimental Farms, Prof. Frank T. Shutt:—

British Columbia Soils.

SPALLUMCHEEN VALLEY.

CENTRAL EXPERIMENTAL FARM,
OTTAWA, April 11th, 1901.

Donald Graham, Esq.,
Armstrong, B. C.

DEAR SIR,—I beg to report as follows upon the soils from the Spallumcheen Valley, B. C., forwarded by you for examination:—

Analysis of Soils (Air-dried).

	Surface Soil.	Subsoil.
Moisture	3.80	3.81
Organic and volatile matter	12.28	7.70
Insoluble rock matter	65.46	63.51
Oxide of iron and alumina	15.80	21.15
Lime	.69	.82
Magnesia	.09	1.21
Potash	.83	1.09
Phosphoric acid	.23	.16
Soluble silica	.09	.05
Carbonic acid, &c., undetermined	.73	.50
	100.00	100.00
Nitrogen in organic matter	.415	.161

Available Constituents.

Potash	.029
Phosphoric acid	.028
Lime	.316

These data give evidence of a high degree of fertility. Judged by the standards of fertility suggested by Dr. Hilgard, as well as by those we have provisionally established from our work on Canadian soils, I conclude that this soil is well supplied with all the more important constituents of plant food; indeed, it must be considered a soil of more than average richness.

Further, the proportions of the mineral elements, potash, phosphoric acid and lime, more or less immediately available, are very satisfactory, so that with a sufficient supply of moisture, excellent crop yields should be obtained.

In the larger number of the determinations, the subsoil shows that plant food is abundantly present, but the fact that this subsoil bakes into somewhat hard masses shows that drainage and a dressing of lime would be beneficial.

The physical texture of the surface soil, as far as I can judge from the sample forwarded, appears to be excellent, due, no doubt, largely to the favourable proportion of humus present. A mechanical separation shows about 55 per cent. of coarse sand. This fact places it in the category of soils well adapted for general cultivation, the limits of which are, according to English authorities, as follows:—

Sand	50 to 70 per cent.
Clay	20 to 30 "
Pulverized limestone	5 to 10 "
Organic matter	5 to 10 "

Our analysis of the sample of marl furnished the following results:—

Carbonate of lime	52.68
Insoluble rock matter	23.11
Moisture, organic matter	24.21
Oxide of iron and alumina	
	100.00

Though not equal to the best samples, it is of very fair quality, and would, no doubt, prove a useful source of lime for soils in the district.

It cannot be said that this soil is deficient in lime, but I have no doubt an occasional dressing of lime or marl would give a good return.

Yours faithfully,
(Signed) FRANK T. SHUTT,
Chemist, Experimental Farms.

LOWER FRASER.

A sample of the surface soil, together with its underlying subsoil or hard-pan, representing the character of the soil on the peninsula formed by the Fraser River and Burrard Inlet, have been submitted to careful and complete analysis. The examination was undertaken with a view of rendering assistance to the fruit growers, market gardeners and farmers in the neighbourhood of New Westminster, who had found considerable difficulty in profitably working this soil. The collection of the soils was made by Mr. W. J. Brandrith, Secretary, British Columbia Fruit Growers' Association, New Westminster, who, speaking of the samples, under date of February 20th, 1900, says:—

"No. 1 is a virgin soil; it has never been disturbed by the hand of man, but thirty years ago a very destructive fire swept over the whole district. The timber had been chiefly cedar; a second growth of red fir, poplar and willow is now growing. The depth of soil to the hard-pan varies from 6 inches to 5 feet, and averages about 2 feet 6 inches. The soils were taken from Lot 25, Group 1, New Westminster District, Municipality of Burnaby, and distant about 27 chains from the northern boundary of New Westminster. It is a very fair sample of the soil of the whole peninsula formed by the Fraser River and Burrard Inlet.

"No. 2 is from the hard-pan underlying No. 1. It has been exposed to the air, but not to the rain, since September 26th, 1899.

"No. 3 is from the hard-pan, taken from a depth of 2 feet in the hard-pan, or 5 feet from the surface of the soil."

Analysis and Report.

No. 1.—The soil has all the appearance of a light, sandy loam; it contains a considerable amount of gravel and small pebbles, as well as of undecomposed root fibre. Tested with litmus paper, it gives a strong acid reaction. After preparation, the fine earth (which in the air-dried condition is of a greyish-red colour) was submitted to analysis.

Nos. 2 and 3 are light grey in colour. They consist of firmly cemented masses, chiefly of sand, with pebbles intermixed. To the eye there is no indication in either of them of humus, and they have the appearance of being exceedingly poor and refractory.

Analysis of soils (water free), Municipality of Burnaby, B. C., 1900.

Soil.	Organic & Volatile matter.	Clay & sand.	Oxide of Iron and Alumina.	Lime.	Magnesia.	Potash.	Phosphoric Acid.	Soluble Silica.	Carbonic Acid, etc., undetermined.	Total.	Nitrogen.	Available.		
												Potash.	Phos. Acid.	Lime.
1. Surface..................	9.00	77.98	11.65	0.35	1.26	0.12	0.13	0.12	......	100.61	.148	.0088	.0049	.0039
2. Hard-pan 2 ft. from surface	4.07	82.14	11.56	0.70	1.18	0.15	0.13	0.09	......	100.02	.041	.0062	.0173	.0490
3. Hard-pan 5 ft. from surface	3.60	82.75	11.22	0.36	0.65	0.16	0.13	0.08	1.05	100.00	.028	......	.....	......

No. 1.—Surface Soil.—The chief constituents to consider are potash, phosphoric acid, and nitrogen and lime. Our previous work on Canadian soils would show that good examples from uncultivated areas will, as a rule, contain from .25 to .50 per cent. potash, from .15 to .25 per cent. phosphoric acid, from .15 to 2 per cent. nitrogen, and from .5 per cent. upwards of lime. Many of our richest soils have numbers far larger, but these may fairly represent the limits exhibited by soils of good medium quality. The amounts of potash, phosphoric acid and lime designated in the table as available are those obtained by digesting the soil with a 1 per cent. solution of citric acid in the cold. English results seem to justify the assumption that less than .01 per cent. of phosphoric acid so obtained indicates the soil's need of phosphoric manure. With regard to the available potash, Dr. Dyer, who showed that the acidity of root sap was approximately equal to the afore-mentioned solvent, says, that when such potash falls below .005 per cent., potash fertilizers would prove valuable. Judged by these standards, we are obliged to confess this soil as considerably below the average in all its important elements, save perhaps in available potash.

Humus and Nitrogen.—It is extremely doubtful if commercial fertilizers could be used profitably on this soil, unless supplemented, or rather preceded, by organic manures. When the store of humus has been increased, the soil will be more retentive of and responsive to such plant food as may be supplied in chemical fertilizers, and further, it will be warmer and furnish a more comfortable medium for seed germination and root extension. Barn-yard manure naturally stands first in importance as a source of soil humus; it would be difficult to over-estimate the value of this manure for soil such as we are discussing. Not only for its organic matter is it to be recommended; as a supplier of nitrogen and a considerable amount of mineral matter in a more or less available condition, it has a distinct value.

Unfortunately, in the majority of cases, especially where there is a considerable area tilled, there is not a sufficiency of manure, and then it becomes of the highest importance to know what can be most economically used as a substitute. Where swamp muck occurs, this material may be utilised, first being piled and allowed to dry out and then fermented as in the compost heap, either with manure or with lime or wood ashes. The air-dried muck may be employed as an absorbent in the cow stable, pig pen, etc., to absorb the liquid manure. In this way a double purpose is served, the valuable liquid portion of the manure, which might otherwise be lost, is retained, and the fertilizing elements in the muck set free. Good samples of air-dried muck will contain from 65 per cent. to 85 per cent. organic matter, and from 1.25 to 2.5 nitrogen.

Possibly the only feasible plan of furnishing humus and nitrogen over large areas is by the turning under of a growing crop of clover or some other legume. This is termed green manuring, and is certainly to be regarded as the most economical and one of the quickest methods of replenishing the soil's humus. The benefits to be derived from green manuring, especially when a legume is used, have so repeatedly been set forth in our past reports that it may not be necessary to speak at any length on that subject. It is well to emphasise, however, in this connection, three points: First, if the soil is too poor to grow clover, buckwheat or rye may be ploughed under for a year or two and the soil thus made suitable for clover; secondly, that a dressing of wood ashes or a fertilizer containing potash and phosphoric acid will very much help the clover; and, thirdly, there will be no practical enrichment of the soil with nitrogen unless a legume is used, since the legumes only have the ability (by the means of certain germs that reside in nodules on their roots) to appropriate and store up the free nitrogen of the air.

Lime.—The analytical data show that this soil is by no means rich in lime, and its well-marked acidity accentuates this fact. The land evidently stands in need of lime, not only as a source of plant food, but to correct that sourness which is injurious to most farm crops. Since it is not wise to make heavy application, and since this element has the tendency to work or wash down into the subsoil out of reach of the roots, the application of say twenty bushels per acre every second or third year will prove better practice than a larger dressing at greater intervals. If phosphoric acid is applied in the form of basic slag, much less lime than that indicated will be necessary, since that fertilizer contains a considerable proportion (usually 12 per cent. to 15 per cent.) of free lime.

Shallow culture, *i. e.*, shallow ploughing with an occasional loosening, but not bringing to the surface, of the subsoil is to be advised for this and similar soils. It seems desirable, owing to its light and hungry character, to keep the humus, lime and other fertilizers as far as possible in the first four or five inches of soil. A deep tilth is undoubtedly a feature of great value, but it can scarcely be economically produced and retained in very light, sandy soils.

Commercial Fertilizers.

In the question of commercial fertilizers it will only be possible to indicate the general principles to be followed, since the nature of the crop to be grown and the past history of the field must necessarily be taken into consideration before definite formula for any specific purpose can be suggested. The following remarks, however, may be useful:—

Nitrogen.—Of the commercial forms of organic nitrogen in British Columbia, fish-waste prepared from the offal of canning factories, sometimes known as fish meal or bone pomace, holds a high place. Its composition will vary according to the parts of the fish that predominate in its preparation; thus, some samples may contain between 2 or 3 per cent. of nitrogen and 10 to 15 per cent. of phosphoric acid, while others possess 5 to 7 per cent. of nitrogen, and 2 to 3 per cent. phosphoric acid. This fertilizer, it is obvious, may be used to supply two or three elements generally necessary, but should be supplanted by a potash manure, such as Kainit, muriate of potash, or wood ashes.

We may regard it as a concentrated and quick-acting manure, best used as a top dressing or applied to the ploughed land and lightly harrowed in before seeding. It has been applied with success to grain crops and grass lands especially, and gives the greatest returns on light, warm, well-drained loams. For an ordinary dressing, a mixture of 500 pounds of fish meal and 100 pounds of muriate of potash per acre, is suggested.

Nitrate of soda and sulphate of ammonia furnish large amounts of readily assimilable nitrogen. Undoubtedly the former, considering the character of the soil, will be the better; for acid soils and soils deficient in lime, sulphate of ammonia may do positive harm. From 100 pounds to 200 pounds per acre may be applied in several applications (at intervals of a few weeks), as a top dressing, during the earlier months of growth. The greater solubility of nitrate points to the advisability of never applying it save when there are growing plants to make use of it, and the economy of several smaller dressings, rather than one large one, at the opening of the season.

Phosphoric Acid.—Bone meal, superphosphate and basic (Thomas) slag, are the chief phosphatic fertilizers obtainable, leaving out of consideration fish pomace, already referred to. Bone meal is a source of nitrogen also, containing from 2.5 to 4.0 per cent. of this element. Its phosphoric acid is not immediately assimilable, but becomes so gradually in a soil that is warm, moist and well drained. It is probably better suited for grass lands and orchards than for crops with a short season of growth. The usual application lies between 300 and 500 pounds per acre.

Owing to the sourness of the soil of this tract and its deficiency in lime, the writer is of the opinion that basic slag, finely ground, would be found a very useful source of phosphoric acid. It contains in the neighbourhood of 17 per cent. phosphoric acid and 15 per cent. free lime. Its application may be from 300 to 500 pounds per acre. Such excellent results have been obtained from this fertilizer in Germany and England, that it would appear to be worth a trial, especially on soils similar to those we are now considering.

Potash.—Unfortunately, it appears that wood ashes—a most valuable source of this element—are not purchasable in British Columbia.

To those in proximity to the Coast, sea-weed will prove a cheap and valuable manure, since it contains considerable amounts of potash and nitrogen. Unless well dried, it would scarcely pay to freight sea-weed any distance inland, and in any case it is advisable to allow sea-weed to lose a portion of its water before hauling to the farm.

Kainit, muriate of potash and sulphate of potash are potassic manures imported from Germany. Kainit contains about 12 per cent. actual potash; muriate and sulphate, about 50 per cent. actual potash. These fertilizers should always be bought on guaranteed analysis. The average application of the muriate and sulphate is 100 pounds per acre; of the kainit, about 400 pounds per acre. As the winter season in this district is always more or less open and rainy, the writer is of the opinion that spring application of these fertilizers would prove the most profitable.

Most poor and exhausted soils respond best to a complete fertilizer; that is, one that contains all three of the elements of plant food—nitrogen, phosphoric acid and potash. The proportion of each of these most economical to use must, however, be largely determined by the character of the crop to be grown, the nature of the past manuring, and the results of careful experimenting on the soil with the crop under consideration. The amounts we have given in this report are those commonly employed; more specific instructions require a knowledge of the circumstances. Those desiring further information on this subject are invited to place themselves in correspondence with this division.

Liming of Soils sometimes Injurious.

(*Farmers' Bulletin 77, U. S. Department of Agriculture, by H. J. Wheeler, Ph. D.*)

Excessive amounts of lime, especially on light soils, may have an injurious action. This is particularly true of freshly-slacked lime upon light, sandy soils, containing but small amounts of organic matter. It hastens unduly the decomposition of the organic matter, and thus renders the soil more open and less retentive of fertilizers and moisture than before. If freshly-slacked lime must be used upon such soils, it should be applied in small amounts and at not too frequent intervals. As stated heretofore, clay marls are much better adapted than any other forms of lime for the improvement of such soils. In lieu of such marl, wood ashes or lime which has been exposed to the action of the air for a long time might be preferable to lime freshly prepared.

Before the advent of complete fertilizers it was a common adage that liming makes "rich fathers and poor sons." If lime is used alone it serves to liberate potash, nitrogen, and perhaps, sometimes, phosphoric acid, and the extra drain of increased crops on the soil naturally leaves it finally in a worse condition than at the outset. In other cases the soil reverts, after many years, to its former state of unproductiveness, without any appreciable injury. Continued success from liming can only be obtained by the use of the other essential—manurial fertilizing constituents in connection with the lime. Few, if any, cases are on record where soils originally in need of lime have failed to continue to give good results from liming, when care was taken to maintain a supply of the other essential constituents and where lime was applied in moderate amounts. There are impure forms of lime which, after burning, will harden like cement, and which, on this account, may have an injurious action upon the soil. If pulverized without burning, they are capable of yielding good results.

Dolomitic (magnesian) limestone contains widely-varying percentages of magnesia and lime. Such stone, if containing high percentages of magnesia, may sometimes prove objectionable if used exclusively. When such material is applied to soils, the lime is removed by crops and drainage more rapidly than the magnesia; and if the lime thus becomes practically exhausted the residual magnesia in the soil may have an injurious action. This can, however, be overcome by adding more lime. Rather than use such lime for long periods of years on the same land, it would be preferable to alternate frequently with lime containing little or no magnesia. Some magnesia in lime is by no means objectionable, and may on certain soils prove positively beneficial.

Plants benefited by Liming.

The following are some of the plants which, in experiments on acid soils at the Rhode Island Experiment Station, have showed marked benefit from the use of lime:—Spinach, lettuce, beets (all kinds), gumbo (okra), salsify (vegetable oyster), celery, onion, parsnip, cauliflower, cucumber, egg-plant, cantaloupe, asparagus, kohl-rabi, cabbage, dandelion, Swedish turnip, pepper, pea, peanut, martynia, tobacco, sorghum, alfalfa, clover, barley, wheat, oats, timothy and Kentucky blue grass. Not only was the crop greater, but in many instances it was ready for market much earlier where the soil was limed. There was at least two weeks' difference in kohl-rabi in this respect. Tobacco not only made a much better growth when limed, but the ash was much lighter in colour.

PLANTS INJURED BY LIMING.

A few plants have shown considerable injury from the use of lime; these are serradella, water-melon, blue lupine, and common sorrel (*Rumex acetosella*). Only one season's results are on record with serradella, but the other plants have been tested for several seasons with the same results. Extensive European tests have also shown the lupine to be injured by liming. Though common sorrel is directly injured by liming, the chief effect of lime in ridding land from sorrel seems to be attributable to its favouring the growth of cultivated plants to such an extent that the sorrel is smothered by them.

INFLUENCE OF LIME UPON SOME PLANT DISEASES.

Potato Scab.—It has been shown that carbonate of lime and such other forms of lime as are changed into the carbonate by decomposition within the soil all tend to favour the production of potato scab, provided the germs of the disease are already within the soil or are introduced into it on the seed tubers. This seems to be due to the fact that the lime makes the soil alkaline, or to some influence which the combined carbonic acid of the carbonate of lime exerts upon the development of the fungus.

In view of this unfavourable action of lime, caution should be observed in liming potato fields. If such fields are to receive the treatment, they should be limed, if possible, some time before potatoes are to be grown. The seed tubers employed should also be treated, before planting, with corrosive sublimate or some other effective fungicide.

Club Root.—Many writers seem to agree that liming is capable of lessening materially the injury to turnips, cabbages, etc., caused by the disease known as "finger and toe" and "clubroot." English writers assert that by resorting to liming excellent crops of turnips have been produced where, without it, the crop was a failure, owing to the attacks of the disease.

Other Diseases.—The effect of lime in different forms has been tested, with not entirely conclusive results, on various other diseases, including cranberry and sweet potato diseases, and a root disease of alfalfa (*Rhizoctonia medicaginis*). Slaked lime was found to be effective in reducing soil rot of sweet potatoes, and quick lime in checking or preventing the root disease of alfalfa.

HOW OFTEN SHOULD LIMING BE PRACTISED?

The frequency with which liming should be practised depends upon several conditions; for example, upon the character of the soil, the quantity of lime employed in each application, the number of years involved in a rotation, the plants to be grown, and their order of succession. Formerly, in England, large quantities of lime were applied at somewhat rare intervals, but there and elsewhere, at the present time, the preferable practice seems to be to use small amounts and apply it more frequently. As a general rule, it may be stated that from half a ton to one and a-half tons of lime per acre, applied every five or six years, is sufficient. There may exist extreme soils requiring either more or less than these amounts. If soils which are quite acid and have not been previously limed are to be seeded, with the intention of allowing them to remain in grass for several years, as much as two or three tons per acre may be advisable. Only very extreme cases would call for larger applications. If, in a rotation covering a considerable number of years, two crops especially benefited by lime are introduced at about equi-distant intervals of time, it may be advisable to lime twice in the course of the rotation, each time just prior to their introduction. In renovating acid pastures and meadows it is usually preferable to apply a fair amount of lime upon the furrows when they are first ploughed, so that this may be thoroughly mixed with the soil by subsequent ploughing and harrowing, and just prior to seeding to grass make another generous application. By such treatment, providing the other fertilizing ingredients are employed, a good stand of clover, Kentucky blue grass, timothy and other grasses may be obtained, where in many instances they were formerly partial or total failures, and where only red top, Rhode Island bent, and grasses having similar soil adaptability could be grown. Where land is kept in grass for a number of consecutive years, top-dressing with lime may be advisable, particularly if ordinary commercial fertilizers are employed in lieu of stable manure.

WHEN TO APPLY LIME.

Lime, in the form of carbonate of lime, as in marl, wood ashes, etc., can usually be applied with safety in the spring or at any other season of the year, but autumn is always the safest time to apply caustic or slacked lime. The latter form changes gradually into carbonate of lime, which is not caustic, upon exposure to the air, but usually has a considerable quantity that has not yet reached that stage when applied, and it may in consequence act too energetically. This is particularly true if the soil is light and sandy, and if plants which are but little helped by lime are employed. On very acid soils, particularly such as contain much humus, there is little or no danger from applying reasonable quantities of lime in the spring. If caustic or slacked lime is applied in excessive amounts, it may not only injure plants directly, but also indirectly, by rendering the texture of the soil unfavourable; it may also make the soil temporarily so alkaline as to interfere with the activity of the organisms which transform ammonia into readily assimilable nitrates. Injury thus arising cannot ordinarily be of long duration, for the reason that the carbonic acid of the soils changes the caustic lime rapidly into carbonate of lime, and thus the alkalinity of the soil is soon reduced.

HOW TO APPLY LIME.

Some writers recommend that upon old, mossy meadows and pastures lime should be applied to the surface before ploughing, in order that it may help to quickly decompose the organic matter. The chief objection to this procedure is that the lime does not become well incorporated with the soil, and since some of it is turned to the bottom of the furrow and its tendency at all times is to work downwards, it may be quickly carried not only away from the surface soil but also from the reach of plants. The practice of liming such soils immediately after ploughing and then thoroughly harrowing has been attended by excellent results. This is particularly the case provided a second application is made in a similar manner, just previous to re-seeding. Under such a plan some lime becomes intimately mixed with the entire mass of soil by the operations of tillage, and finally a considerable amount is left near the surface, thus accomplishing two important objects.

In some sections where marl is extensively used it is spread upon the surface and ploughed under, turning a furrow about two inches deep. The more common method, where marling is practised, is to plough the land and then cart on the marl, dumping it in heaps at such intervals that it can be spread conveniently with a shovel. If the marl is not sufficiently fine and is of a nature that it crumbles upon exposure to the air, the heaps may be allowed to remain for some time before spreading, and still further time may be allowed to elapse before the operation of harrowing is begun. Sometimes a "clod-crusher" or "bush harrow" may be employed to advantage to break up the lumps before harrowing. A most important point to be observed in applying lime in all of its forms is to mix it with the soil as thoroughly as possible, the finer the particles the better being the result. Lime which is already slacked may be spread upon the soil, directly from waggons or carts, or dumped in heaps and then spread with a shovel, though the most satisfactory plan in such cases is to employ an ordinary grain drill with fertilizer attachment or a lime spreader. In the use of such spreaders it is generally advisable to attach some burlap or old bagging to the sides and rear of the machine, in such a way that it will trail upon the ground. If the machine is so equipped and the burlap is weighted with a piece of wood at the rear, much of the unpleasantness connected with spreading lime is avoided. For those familiar with the nature of lime and its use it is unnecessary to state that it is well, if possible, to apply it on a quiet day. The eyes may be protected by glasses and the nostrils and mouth by devices used by those who run threshing machines.

The only other form of lime in connection with the application of which any particular difficulty might be encountered is quick or burned lime. Where only small quantities of caustic lime are to be used, it is frequently immersed for a moment in water, in a basket, and emptied into a waggon body. The following day it will be slacked sufficiently for use. Where larger quantities are used, and a lime spreader is at hand, the lime is sometimes water-slacked in large piles on the border of the field and then distributed. To accomplish the water-slacking in a satisfactory manner, from 2 to 2½ pails of water may be sprinkled over each cask of lime as it is emptied upon the pile, and finally the whole mass should be very thoroughly covered with soil. In a few days, practically all of the lime will be in a fine condition suitable for spreading. In loading it into the spreader, care should be taken to first remove the soil, so as to avoid its clogging the machine. If the lime spreader itself is not fitted with a screen, the lime should first be carefully screened, for the purpose of removing any hard lumps which may remain, due to imperfect slacking or burning. These lumps may be further slacked by themselves.

A practice preferred by many, and probably the most feasible one where a lime spreader is not to be had, is to place the burned lime in piles of from 35 to 40 pounds each at suitable intervals (heaps of this size, 20 feet apart in each direction, equal about two tons per acre) and cover the piles with earth. In a few days the lime is so thoroughly slacked that it can be spread directly with a shovel. Provided the soil is dry, from one-fourth to half a pail of water (or in extreme cases even more) should be sprinkled over each pile immediately before it is covered with earth. In this case, as in all others where slacked lime is employed, it is important that it be harrowed into the soil immediately after spreading. In no case should it be exposed long to the air before harrowing, or it is liable to cake and form a sort of mortar to such an extent that it is impossible to mix it thoroughly with the soil as before.

Prices of Lime and Fertilizers.

Whilst disclaiming any intention of advertising the wares of dealers in the articles abovenamed, I have been asked so often as to the prices at which they can be obtained, that I feel justified in giving the following to the public, especially as I am not aware that there are any other dealers in the articles referred to in the Province. I may say that this Department can always be used as a channel to convey information of a useful character to agriculturists.

Messrs. Raymond & Sons, of Victoria, offer lime in sacks, for agricultural purposes, by the ton at the rate of $5 per ton delivered f. o. b. at their wharf, or at any other point in Victoria at the rate of $6 per ton.

The Victoria Chemical Co. (Ld.), furnish the following:—

PRICE LIST OF CHEMICAL FERTILIZERS.

Sulphate of Potash	$3 15	per 100 lb.	$57 50	per ton.
Muriate of Potash	3 00	"	55 00	"
Kainite	1 50	"	25 00	"
Superphosphate of Lime	1 50	"	25 00	"
Thomas' Phosphate Powder	1 65	"	27 50	"
Mixed Fertilizer	1 25	"	20 00	"
Nitrate of Soda	2 75	"	50 00	"

Terms, net cash.—Orders of over one ton delivered f. o. b. or f. o. r., Victoria. On orders of less than one ton, cartage and wharfage charged.

Sodium Nitrate and Ammonium Sulphate.

(American Gardening.)

Although sulphate of lime and sulphate of ammonia are chemically distinct substances in their use as manures, they become, however, much alike. While nitrate of soda undergoes but little change in the soil, the sulphate of ammonia is profoundly altered. By contact under favourable conditions with a moist soil containing carbonate of lime, the sulphate of ammonia is finally resolved into two salts, the sulphate and nitrate of calcium; and the mention of this fact will show that the presence of lime in the soil is essential to its efficiency.

According to the results of the investigation made by Prof. Warrington, and published by the Royal Agricultural Society of England, sulphate of ammonia cannot be profitably used as a manure on land destitute of lime, and in its use on soils containing a large percentage of carbonate of lime, the best results are obtained by covering it with soil by plough or spade, or rake or harrow, immediately after its application. Even on ordinary land the best results are obtained from mixing it with the soil. Although they may be successfully used as a top dressing for some crops, ammonia salts do not become available as plant food till they have been converted into nitrate of calcium, and this nitrification will not take place in a dry soil, but in most arable land it will quickly occur in showery weather.

In consequence of the various changes proceeding more slowly, the effect of sulphate of ammonia is more gradual than that of nitrate of soda, and is especially prolonged in soils containing little lime, or when associated with organic manures. On the other hand, nitrate of soda may be successfully used on land containing no lime, and as it is immediately available as plant food and distributes itself in the soil more rapidly than the nitrate of calcium arising from the nitrification of sulphate, is more suitable for use as top dressings to growing crops and for application at a late period in the growth of the crop.

In dry seasons nitrate of soda gives a better return for the same quantity of nitrogen applied; and the greater crop frequently given by it is in part due to the soda which it supplies, the soda acting beneficially both in the soil and in the plant. The produce yielded by sulphate of ammonia is more dependent on the presence in the soil of an abundant supply of ash constituents than is the case when nitrate of soda is employed. This is probably due to the power the last-named fertilizer has of acting upon the potash and other alkalies contained in the soil and rendering them available as plant food.

To summarize:—Sulphate of ammonia is the most suitable for use where the soil is naturally moist and contains a liberal percentage of lime, and for crops that are of comparatively slow growth, while nitrate of soda gives excellent results on soils that are naturally dry and contain but little calcareous matter.

With regard to the influence of these two manures on the bulk and quality of the crop, it would appear that the largest yield is in the majority of cases obtained from nitrate of soda, and the highest quality produced from sulphate of ammonia.

Sulphate of ammonia contains about 25 per cent. of ammonia, equivalent to about 20½ per cent. of nitrogen; sodium nitrate has about 15½ per cent. nitrogen, as it is usually met with as a fertilizer. It is thus seen that the sulphate salt has the greater percentage of nitrogen, but its action on the crop cannot be estimated from that fact; there are other considerations, and the only sure thing, here as elsewhere in agricultural practice, is to follow an intelligent line of procedure and make a practical test.

BIRDS.

In connection with this question, much has been said and written for and against some birds. In this country, those which have been most condemned are the bluejay, the crow, and hawks in general, in the order they are given, and the Government has been repeatedly asked to offer a bounty for their extermination. The first mentioned is especially condemned, almost without exception, and it is hard indeed to discover a single redeeming quality in this handsome but unprincipled depredator of the farmers' crops. Of the other two, the crow, as will be seen by the appended extracts, is not altogether bad; in fact, he has, it appears, many more virtues than sins; whilst in the case of hawks, the preponderance is so immeasurably in favour of all but four—and there are over a hundred species, including owls and eagles—that it would be folly to offer a bounty for their indiscriminate destruction. The Government, therefore, in view of these facts, and in view of the fact that it has not been convinced by scientific means of the irredeemable wickedness of the bluejay, has so far refused to accede to the requests for a bounty for the destruction of these birds, a course which, it is feared, might bring untold disaster in its train.

The following excerpts speak for themselves:—

A Plea for the Birds.

(Colonist, August 19th, 1900.)

The recent extraordinary visitation in the North-West of that very destructive pest, the cut-worm, and its terrible ravages to the farmers' crops, have revived interest in a question of vital importance to the whole of British Columbia, namely, the desirability of taking definite steps towards increasing the number of song and other birds in the Province.

Those who have given the matter some attention, and are therefore in a position to speak with some degree of authority, are unanimous in declaring that it is of vital importance that the birds now in the Province shall be preserved from destruction and that more should be immediately imported.

Recognising the danger to the farmers which lies in neglecting to take steps towards that end, several public-spirited citizens have commenced an agitation which will probably result in securing the desired importation. Among those who are moving in the matter are Hon. J. H. Turner, Minister of Finance; Mr. John Bryden, officials of the Agricultural Department, and the Natural History Society.

To a "Colonist" representative who interviewed a number of the gentlemen on the important topic, Mr. Turner said he was deeply impressed with the necessity of taking immediate steps to secure the importation of birds. A few years ago a similar agitation was on foot and a sum of money was raised by private subscription to secure a number of song birds from the old country; but the movement was frowned upon by certain of the farmers, who were afraid that the birds would destroy their seeds. Mr. Turner did not think the farmers were right in taking this view of the matter. Competent authorities had cited ample evidence showing that the birds did more good than damage. Of course, they destroyed a small quantity of fruit and picked up a quantity of seeds, but the good they did in destroying worms, grubs and flies far exceeded any damage they might do. Mr. Turner was in favour of the cities taking the question up and a subscription being raised to defray the cost of bringing the birds from California. San Francisco maintains an immense aviary, a large area being caged in so as to permit the birds to breed and the young ones to mature.

Mr. Bryden was equally enthusastic in his expressions of approval of the idea of importing birds. He thought that not only grub-destroying birds should be obtained, but song birds, such as the linnet, goldfinch, lark, thrush, bullfinch and little robin. He thought the question of the importation of birds was the most important one which had confronted the farmers of the Province for many years. Small birds are unusually scarce this year, and to that fact is probably due the visitation of the cut-worm and its deadly consequences. The use of Paris green and other poisons to get rid of the pests might result in disaster to the birds, as, when they go into the patches to feed on the worms, they are attracted by the mixture, and the consequences are always fatal. The birds should be preserved by all means. They would, perhaps, destroy a few cherries and pick up a few seeds, but they did much more good than harm. There was never any objection found in England to the conduct of the birds. True, there, as in this country, they ate a few cherries and picked up seeds, but it was always recognised that they worked for the farmers' good, and their visitations were consequently welcomed. Mr. Bryden thinks the Provincial Government should take the matter up, make a small appropriation and ask the co-operation on similar lines of the various cities and municipalities throughout the Province.

A clipping from the "Coast Seamen's Journal" says:—

"A French naturalist asserts that if the world should become birdless man could not inhabit it after nine years, in spite of all the sprays and poisons that could be manufactured for the destruction of the insects. The insects and slugs would simply eat up all the orchards and crops during that period."

In connection with the above, an interesting coincidence has to be noted. In the interview with Curator Fannin, which appears below, it will be seen that Mr. Fannin makes the same prediction as does the French naturalist. The former's remarks had been taken down by the reporter before the clipping was shown him, and he was much suprised to see his views corroborated by such a high authority.

In connection with the subject with which this article deals, it will be of interest to reproduce the following from the pen of W. B. Anderson, Editor of the "Cumberland News":—

"In another column may be seen a statement made by a scientist regarding birds, which should cause everyone to seriously study the problem of bird life in relation to agriculture. A few people are aware that birds are beneficial in one way or another to mankind. Fewer still know, or partly know, that all birds are so. Many have a dim conception that some few birds destroy noxious insects, and class the large majority as either useless or destructive, while probably nine-tenths of the human race never give the subject a thought. The recent disastrous invasion of cut-worms in this Province, and the incalculable damage they have wrought in their peregrinations, has brought to light curious facts in regard to birds that have been partly known to the writer for some time, and have encouraged him to proceed with the writing of certain papers on the subject of the relation of birds to agriculture which he has long had in contemplation. We will begin with that much despised, execrated and hunted member of the feathered tribe—the crow. First we will relate what has been told us in the last few days. A prominent farmer of the valley, who has lost nearly all his crops by the worm, has still a fine crop of fruit, apples and pears, the trees of which the worms a few days ago had attacked viciously, and in such numbers that he was confident that the next night would see them stripped of both fruit and foliage. A large flock of crows happened along just after the trees were attacked and spent the rest of the day in the orchard, with the result that the trees are still bearing their leaves and fruit, and Mr. Worm took inside passage for the far-off land. That farmer had been in the habit of shooting all the crows whenever they came about his place, but he will now protect them faithfully. Another farmer of Denman had a similar experience with a field of carrots. About half were destroyed when crows happened to espy the worms, and alighting on the field they completely cleared it of pests and saved him the remainder of the crop. He now swears by Jim Crow. But these two men happened to be of an observant nature. How many more, on seeing the orchard or field darkened by these birds, would have stopped to inquire whether they were there for good or for evil? How many but would have rushed for the gun, or sent the boys after them with firearms and stones? The first step in the right direction is to find out what a bird means by his somewhat apparently injurious or meaningless actions.

"If we are not satisfied with what we see, let us shoot him and dissect his stomach. One more or less will not signify, so long as it is for a good purpose. We open the crow's gullet, and find—what? About 10 per cent. fruit or grain, 40 per cent. carrion, and 50 per cent. of worms, caterpillars and insects of various kinds which destroy the farmer's fields and the gardener's acre alike. See him in the spring at ploughing time. A farmer begins a field. In a short time (if he has not been shot at continually) he and his friends, flying over the barren earth in search of food, espy the fresh-turned earth. They wheel about and alight, and in a short time have picked over the already turned ground, and are industriously following the plough. When the end of the furrow is reached they fly or waddle across to the other land side and pick up the furrow there, and so on all day long. A more faithful servant a farmer never had; but, alas, too often repaid for his hard day's work by a shot from a gun. I have seen a grass field from which the hay had been hauled, strewn over with crows. Were they eating anything of value? No, only grasshoppers which were there in millions feeding on the aftermath, and often have I seen the farmer come out with a gun and shoot at these birds, which were worth their weight in gold to him, or any other grower, because he was afraid they would steal a little fruit in the adjoining orchard."

The reporter of the "Colonist" called upon the Deputy Minister of Agriculture and asked his opinion on the subject of birds in their relation to agriculture. Mr. Anderson said:—

"I consider the subject to be a vital question to agriculturists, and I venture to say that even those birds with the very worst of reputations have some good points which go far towards counterbalancing their evil deeds. It is an undeniable fact that the crow does steal apples and young chickens, that the bluejay, so generally condemned, does help himself to unconsidered trifles in the way of grain and vegetables, and that the robin (so-called) brings up her young to appropriate the cherries in the nearest orchard. But these articles of food do not last the year round, and I ask on what do these birds subsist for the remaining months of the year? They are always with us and they must live on something. Now, that something consists, as has been proved by scientific observation, principally of insects injurious to vegetation. Even the English sparrow, the derelict of bird kind, has some good qualities, and defenders with proofs of his few virtues are not wanting. Now, I do not wish it to be understood that I am advocating the increase of the birds I mention, but I have selected some of the worst in order to show that even they are not utterly to be condemned. During the recent plague of cut-worms, which one of my correspondents ascribes in part to the absence of birds, which has been remarked, the crow has been conspicuous in redeeming his character by his activity in hunting out the caterpillars."

The following excerpt from a letter written by Mr. Anderson to Dr. Fletcher explains itself:—

"I am sure you will be pleased to hear a good word spoken in favour of the execrated old crow. For some time before it was discovered that the cut-worm plague was upon us, I noticed first one, then several, and then a number of crows, busily engaged amongst the grass on the lawns in front of the Government Buildings. On investigation I discovered that they were after cut-worms, and good work they must have done, judging from the assiduity with which they pursued their labours. I have since had similar reports from several parts of the Province, and even the still more execrated bluejay has come in for a good word from some quarters. The old adage is borne out that a certain gentleman is not always as black as he is painted."

Mr. Anderson points to his various reports as to the stand he has taken on this all-important subject. For instance, in the fourth report he quotes Dr. C. Hart Merriam's remarks from "Hawks and Owls of the United States," as follows—

"When certain birds are known to be harmful to agricultural interests, the farmer has a right to ask that the protection of law be withdrawn from such species, and even that means be taken to diminish their numbers. At first it might seem an easy matter to class birds into two great groups—the injurious species and the beneficial species—but in reality it is very difficult, for however harmful a species might be at one season of the year, or in a certain region, it may be quite the reverse at another season, or in a different region. Thus the bobolink is one of the most highly-prized visitors in the Northern States, and the damage it does to the crops there is so infinitesimal that this weighs nothing against the attraction of its presence and the beauty of its song. In the Southern States this same bobolink, so changed in plumage as to easily pass under an alias, the rice bird, does immense damage to the rice crop—a damage which amounts to over a million dollars a year.

"Another example of the beneficial-injurious species is the crow. What farmer needs to be told of the unprincipled conduct of Jim Crow at and immediately after corn-planting time? The ever-present scare-crow bears mute witness to the crow's fondness for corn, and his thieving habits. But when the corn is past danger the crow changes from an obnoxious to an exemplary member of bird society, and the war he wages on the cut-worm earns him no scanty meed of praise from the grass farmer."

Another class of bird, Mr. Anderson went on to say, which has been the subject of the relentless animosity of man, is that coming under the head of birds of prey, namely, hawks and owls. "I have," he said, "repeatedly been asked to advocate the placing of a bounty on these birds, but with the result of scientific investigations before me, I could not conscientiously adopt such a course, and my opinion is that these birds also should be protected and not ruthlessly destroyed."

Dr. Merriam says of them:

"The result proves that a class of birds commonly looked upon as enemies to the farmer, and indiscriminately destroyed whenever occasion offers, really rank amongst his best friends, and with few exceptions should be preserved and encouraged to take up their abode in the neighbourhood of his home. Only six of the 73 species and sub-species of hawks and owls of the United States are injurious. Of these, three are so extremely rare that they need hardly be considered, and another (the fish hawk) is only indirectly injurious, leaving but two—the sharp-shinned and Cooper's hawk—that really need to be taken into account as enemies of agriculture."

"In short, enough has been said and written," Mr. Anderson went on to say, "to place beyond question that birds in general are more beneficial than harmful. That some of them cause loss is unquestioned; that the loss sustained is, in many cases, more than counterbalanced by the benefits they bestow; in others it is at least counterbalanced; in some it is a moot question, and in very few cases they are acknowledged to be injurious. In view, therefore, of these facts, and they are facts that have been ascertained by careful investigation at a great cost, it is an injudicious policy to encourage the extermination of any class of bird, but rather that every effort should be made towards the preservation of birds we have and to encourage the importation and acclimatization of such birds as are known to be altogether beneficial or harmless songsters. In connection with the latter, I may say that the question is coming up at the meeting of the Natural History Society on Monday evening, with a view of reviving the question of raising a fund for the importation of song and beneficial birds, when, I have no doubt, a discussion of an interesting character will result, and I hope that some of the reporters of the press will be present in order that the result can be made public."

John Fannin, curator of the Provincial Museum, seen by a "Colonist" reporter, said:

"It is perhaps unfair to ask me for an expression of opinion respecting the introduction of foreign birds in this Province, because everyone knows I am on the side of the birds, and always will be, no matter whose ideas are contrary.

"Some time ago the Natural History Society took this matter up and a sum of money was subscribed by the people of Victoria for the purpose of bringing birds from England, but cold water was thrown on the project, and for the time being the work was abandoned. It is an old-time idea that birds are to any great extent injurious to vegetation—an idea that has been exploded years ago.

"The trouble is we do not study the birds. It seems to be too silly a subject for the ordinary person to bother his head with. This is a mistake. If we knew more about the life histories of our wild birds we would know better how to manage our farms. Take and kill off every land bird in the Province, and it would not be very long when not a farmer in British Columbia would be making a living out of the products of his farm. British Columbia has 340 species of birds, each of which lays from two to ten eggs; and considering the fact that nearly all the land birds bring out two broods each season, how very few birds we see. In fact, I have been often told that our Province, comparatively speaking, has no birds.

"We certainly can do with more, and I would say: 'Bring them out, fill our gardens, our shade trees and our fields with song birds, and make life easier and our doctors' bills less.'

"But will they be protected when brought here? Our robin is one of the most destructive birds on insects we have. He is a ground-feeder, and as he hops over the grass nothing in the shape of beetle, slug or worm escapes his bright little eyes, and he gobbles it up; but when the cold weather comes and he can't find his natural food he comes into the city and feeds on the ripe berries of our ornamental trees, and then the small boy comes along with his catapult and kills them by the dozen. This may happen with the song birds, unless the law is better enforced.

"I do not think that there is a single land bird in British Columbia but what does more good than harm. Even hawks, against which the hand of every sportsman in the country is raised, and which are indiscriminately shot wherever found, are not the black terrors they are painted. We have 17 species in the Province, at the doors of only four of which can guilt be laid. These are the sharp-shinned hawk, Cooper's hawk, western goshawk and the red-tailed hawk; but these play such havoc with small rodents and insects that the good they do more than compensates for the harm.

"In a book published by the United States Department of Agriculture, entitled, 'Hawks and Owls of the United States,' Dr. Hart Merriam has this to say of these birds: 'Out of 2,212 stomachs which were examined, 56 per cent. contained mice and other small mammals, 27 per cent. insects, and only 3½ per cent. poultry or game birds.'"

Crows and Woodpeckers.

The following is from the Year Book of the Department of Agriculture of the United States:—

FOOD HABITS OF THE CROW.

Investigations of the food habits of the crow, based on an examination of the contents of 909 stomachs, show that about 29 per cent. of the food for the year consists of grain, of which corn constitutes something more than 21 per cent., the greatest quantity being eaten in the three winter months. All of this must be either waste grain picked up in fields and roads, or corn stolen from cribs or shocks. A good deal is taken also in the three fall months, when corn is soft; and May, the month of sprouting corn, shows a slight increase over the other spring and summer months. The two months of July and August are the only ones in which wheat is eaten to any important extent. Only small quantities of other grains are taken.

On the other hand, the loss of grain is offset by the destruction of insects. These constitute more than 23 per cent. of the crow's yearly diet, and the larger part of them are noxious. If we add the mice, rabbits and other harmful mammals destroyed, we have a total of about 25 per cent. of the food consisting of animals whose destruction is a benefit to the farmer. With the well-known propensity of the crow for searching highways and byways, stock-yards and pastures, it must be admitted that at least one-half of the grain eaten is waste, the consumption of which entails no loss. The remainder of the crow's diet consists of wild fruit, seeds and various animal substances, which may, on the whole, be considered neutral. From this point of view it is evident that what grain the crow takes from the available crop is well paid for by the insects destroyed.

DOWNY WOODPECKER.

Of the various species of woodpeckers in the Eastern States, the two most important are the so-called downy and hairy woodpeckers. These birds are especially given to foraging in orchards, more particularly in winter; for, unlike most species, they do not migrate, but remain on their range the year round.

A study of the contents of the stomachs of many specimens of the downy woodpecker (*Dryobates pubescens*) shows that nearly one-fourth of the yearly food consists of ants. A celebrated French writer upon popular natural history has spoken of the ant as "the little black milk-maid, who pastures her green cows in the meadow of a rose leaf." This is a graphic, if somewhat fanciful, picture of the relations of ants and plant lice (*Aphidæ*); but, unfortunately the black milk-maid does not limit her pastures to the rose leaf meadows. There are comparatively few plants which do not suffer to some extent by the ravages of plant lice, and fruit trees and ornamental shrubs seem to be more especially subject to their attacks. Ants protect these plant lice from harm, and when the plant on which they are feeding is exhausted, carry them to fresh pastures, and in some cases actually build shelters over them. Besides destroying the ants, the downy woodpecker eats many of the plant lice.

Again, when the woodpecker has, by its keen sense of hearing, located the larva of a wood-boring beetle in a tree, and dislodged it with the aid of the sharp-edged chisel and probe, there is much likelihood that the next time it visits the tree it will find a colony of ants snugly established in the burrow of the defunct grub, whose somewhat limited quarters they are extending in every direction. It now brings to bear upon the ants the same apparatus it used in the case of the grub, and they are soon drawn out and devoured. From these two sources are obtained the ants that are found in the food of this bird, and that constitutes 23 per cent. of that food. In both cases the insects are harmful, and the woodpecker stops the injury and benefits the tree.

Of the food of the downy woodpecker, 13 per cent. consists of wood-boring coleopterous larvæ, insects that do an immense amount of damage to fruit and forest trees, and are, as stated, protected from the attacks of ordinary birds by their habit of burrowing in trees. Besides the grubs taken from within the wood, the woodpecker eats many of the parent insects, from whose eggs these grubs are hatched. It also destroys numerous other species that live upon the foliage and bark. Caterpillars, both those that bore into the tree and those that live upon the leaves, constitute 16 per cent. of its food, and bugs that live on berries and give to them such a disagreeable taste, form a considerable portion of its diet. Bark lice or scale insects (*Coccidæ*), pests of the worst description, are also eaten by this bird, and to an extent that is surprising when their minute size is considered.

HAIRY WOODPECKER.

The hairy woodpecker (*Dryobates villosus*) subsists on food that is similar in general to that of the downy; and although it does not eat quite so many ants, it destroys more beetle arvæ and more caterpillars, and thus renders quite as good service in the orchard. In winter birds of both these species are more pressed for food than in summer, and may be seen busily searching the crevices in the bark, where they find hibernating insects and insects' eggs. By devouring these they destroy many enemies that would have attacked the trees at the approach of warm weather.

FLICKER.

The flicker (*Colaptes auratus*), another member of the woodpecker family, is well known to most orchardists and farmers. It is larger than either the downy or hairy woodpecker, and differs somewhat from them in its food habits. It eats fewer beetles and caterpillars, but devours an enormous number of ants. Two stomachs were examined, each of which contained more than 3,000 ants, and in a third were 5,000 of a very minute species. Not all of these ants, however, are obtained from trees; many are species that burrow in the earth, for the flicker is more terrestrial than most of the other woodpeckers, and takes much of its food from the ground.

YELLOW-BELLIED WOODPECKER.

On the other hand, some harm to fruit trees is to be charged against this family, though there is much popular misapprehension in this regard. The smaller species have been called sap-suckers, from the supposition that they puncture holes in the bark of trees in order to get the sap and soft inner bark. The charge is well grounded, but only one species, so far as known, causes any appreciable harm through the practice. This is the yellow-bellied woodpecker (*Sphyrapicus varius*), whose summer range is confined to Canada, the northern portions of the United States, and the Alleghany Mountains, and whose winter residence is in the Southern States. This bird is injurious to certain trees, at times removing the outer bark over a considerable area, and at others pecking numerous holes very close together, in each case practically girdling the tree. As the sap collects in the pits thus formed, the bird drinks it, and also catches the insects that are attracted to the pits by the sweetness of their contents. The trees attacked, mostly birches, mountain ashes, maples and apple trees, often die the first or second year after the girdling is done. Fruit trees, however, are not very frequently attacked by this bird, and the species is not numerous enough to cause any perceptible harm to the forest. Examination of the stomachs of yellow-bellied woodpeckers shows that alburnum, or the soft tissue lying between the inner layer of bark and the hard wood of the tree, constitutes quite an important item of the diet, 23 per cent. of the food of the year. Other woodpeckers also eat sparingly of the same substance, but the little they take is of no practical importance.

RED-BELLIED WOODPECKER.

The red-bellied woodpecker (*Melanerpes carolinus*), which is not common in the East north of Pennsylvania, has fallen into disrepute among the orange-growers of Florida, by its attacks on oranges. It does considerable damage by pecking holes in the ripe fruit, and sometimes causes serious loss. It is to be hoped that experience will show some way to prevent these ravages without destroying the bird, for its harmfulness is confined to the orange-growers of Florida, and it is of much value elsewhere.

OTHER WOODPECKERS.

The other woodpeckers, both Eastern and Western, are all more or less useful to fruit-raisers. In the West and South, besides several subspecies of the hairy and downy woodpeckers, are other members of the same genus (*Dryobates*), which have food habits, as shown by stomach examination, that closely approximate those of the hairy and downy. These include the red-cockaded (*D. borealis*), Texan (*D. scalaris bairdi*), St. Lucas (*D. scalaris lucasanus*), Nuttall's (*D. nuttalli*), and Arizona (*D. arizonæ*). Several woodpeckers belonging to the genus *Picoides*, that inhabit the northern part of the country, and beyond, are equally useful. The genus *Melanerpes*, with its half-dozen species, covers practically the whole United States, and, like the genus *Dryobates*, is a group of useful insectivorous birds, with the possible exception noted above. In the West three species of flickers are found, whose food is practically the same as that of the Eastern species.

Useful Birds and Harmful Birds.

TWENTY-FIVE SPECIES WHICH ARE DECIDEDLY BENEFICIAL TO AGRICULTURE, AND SHOULD BE RIGIDLY PROTECTED.

Common Name.	Scientific Name.	Character of Food.
Marsh Hawk	*Circus hudsonius*	Mice, other small mammals, reptiles and insects.
Red-shouldered Hawk	*Buteo lineatus*	Meadow mice, pine mice, and other small mammals and insects.
Swainson's Hawk	*Buteo swainsoni*	Grasshoppers, crickets and small mammals.
Ferruginous Roughleg	*Archibuteo ferrugineus*	Principally western ground squirrels (*Spermophiles*).
Sparrow Hawk	*Falco sparverius*	Meadow mice and grasshoppers.
Barn Owl	*Stri pratincola*	Rats, mice, shrews, gophers and some insects.
Long-eared Owl	*Asio wilsonianus*	Mice and a few other small mammals constitute about 90 per cent. of the food.
Short-eared Owl	*Asio accipitrinus*	
Barred Owl	*Syrnium nebulosum*	Rabbits, mice, squirrels, cray-fish and frogs.
Screech Owl	*Megascops asio*	Mice, beetles, grasshoppers and other insects.
Yellow-billed Cuckoo	*Coccyzus americanus*	Injurious insects, caterpillars (especially tent caterpillars), some Colorado potato beetles.
Black-billed Cuckoo	*Coccyzus erythrophthalmus*	
Hairy Woodpecker	*Dryobates villosus*	Injurious insects; wood-boring larvæ constitute more than 25 per cent. of the food.
Downy Woodpecker	*Dryobates pubescens*	
Flicker	*Colaptes auratus*	Injurious insects; ants constitute nearly 50 per cent. of the food.
Meadow Lark	*Sturnella magna*	Over 60 per cent. harmful insects, especially grasshoppers.
Baltimore Oriole	*Icterus galbula*	About 80 per cent. injurious insects, especially caterpillars, and beetles whose larvæ are known as wire-worms.
Tree Sparrow	*Spizella monticola*	Immense quantities of noxious weed seed in winter.
Chipping Sparrow	*Spizella socialis*	Injurious insects in summer; seeds of noxious weeds in spring and fall.
Song Sparrow	*Melospiza fasciata*	
Rose-breasted Grosbeak	*Zamelodia ludoviciana*	Colorado potato beetle and other injurious insects.
House Wren	*Troglodytes aedon*	Beetles, grasshoppers, bugs, caterpillars and spiders form its entire food.
Chickadee	*Parus atricapillus*	Minute insects (bark lice) and insect eggs.
Robin	*Merula migratoria*	Beetles, grasshoppers, caterpillars and wild fruit.
Bluebird	*Sialia sialis*	About 25 per cent. grasshoppers, with many caterpillars and spiders.

FIVE SPECIES WHICH ARE INJURIOUS TO AGRICULTURE, AND UNWORTHY OF PROTECTION.

Common Name.	Scientific Name.	Character of Food.
Sharp-shinned Hawk	*Accipiter velox*	Poultry, game birds, and many small insectivorous birds.
Cooper's Hawk	*Accipiter cooperii*	
Goshawk	*Accipiter atricapillus*	Poultry and game birds.
Duck Hawk	*Falco peregrinus anatum*	Game and insectivorous birds.
English Sparrow	*Passer domesticus*	Grain (especially wheat and oats), fruit buds and blossoms.

VARIEGATED CUT-WORMS.

(*Peridroma saucia*—Hbn.)

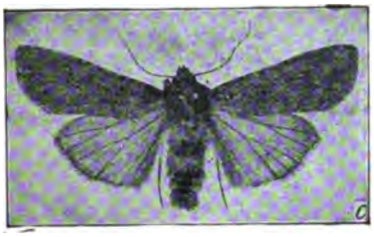

*Fig. 10.—The moth.

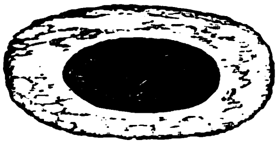

Fig. 11.—Pupa.

(Natural size.)

The disastrous outbreak of this insect in 1900 throughout the whole of the Province, as well as the adjoining American States, the widespread consternation it occasioned, and the lack of knowledge how best to combat the pest, are now matters of history. In view, however, of the fact that very many people are still ignorant on the points named, in spite of the fact that bulletins and leaflets have been issued and scattered broadcast throughout the Province by this Department from the moment the first intimation reached me that the outbreak threatened to be serious, and in order that such information as I can supply may be at hand for future emergencies, I beg to present the following from Dr. Fletcher's report in the Report of the Experimental Farms, 1900:—

Description.

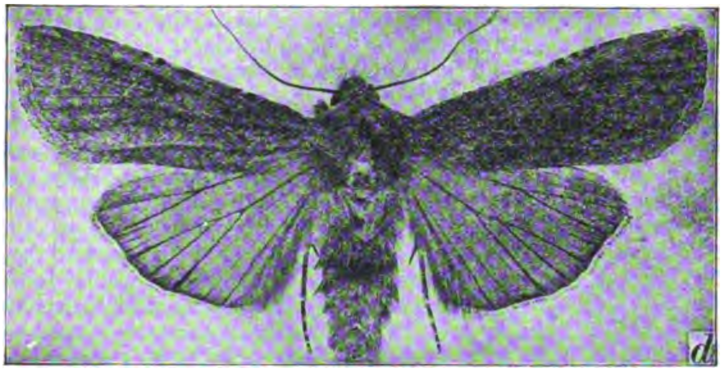

Fig. 12.—Variegated Cut-worm moth—twice natural size.

The moth, which is the parent of the variegated cut-worm, is a large species expanding from an inch and a half to nearly two inches when the wings are spread. It varies very much in colour; the forewings are, as a rule, rather dark brown, but varying to ochreous or russet-brown, shaded on the disk and toward the end of the wing with a darker brown; occasionally specimens are quite light along the costal region and at the base of the wing. The wings are crossed by the usual four more or less distinct double spots on the costa. The reniform or kidney-shaped spot is usually darker than the orbicular or round spot, and the reniform bears a few white scales on the outer margin. In two specimens, no trace of the reniform or of the orbicular can be seen. The underwings are pearly-white in the centre, with a purplish sheen, bordered broadly and veined with dusky-brown and fringed with white (hence the English name of this moth, the pearly underwing). The thorax is of the same colour as the forewings, and bears in the centre a tuft of raised, light-tipped scales.

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*Figures are kindly lent by Dr. James Fletcher, No. 11 being by Prof. Otto Lugger, and Nos. 10, 12, 13 and 14 by Prof. M. V. Slingerland.

The eggs are laid in elongated flat patches, and were first found by Dr. Riley and figured in his First Missouri Report for 1868. In years of great abundance it is probable that these eggs are laid in various places other than on the food plant. Eggs which were most probably of this species were found upon curtains, in clothes hanging upon lines, and on the woodwork of houses, by Mrs. Walton, of Armstrong, B. C., and Mrs. Place, of Dog Creek, B. C. On hatching, the young caterpillars, as is the case with some other cut-worms, are loopers, and resemble the larvæ of the geometrid moths, lacking some of the prolegs which appear in the later stages. A full account of the appearance of the larvæ in the different stages is given by Dr. Lintner in his Fifth Report as State Entomologist of New York.

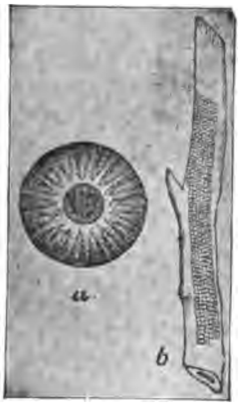


Fig. 13.—Variegated Cut-worm: eggs.

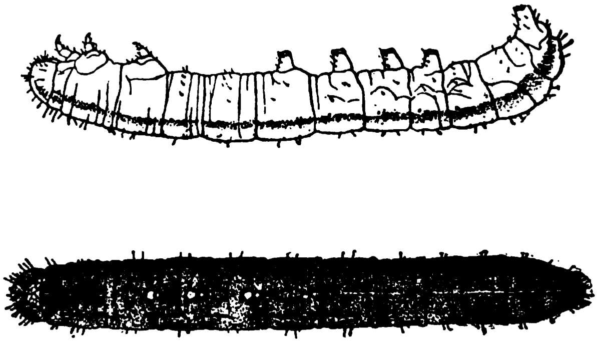


Fig. 14.—Variegated Cut-worm—enlarged one-half.

The following is a description of the full-grown larvæ, the form in which it appeared as such a destructive enemy among the crops of British Columbia last season:—

"Heavy-bodied cut-worms, about two inches in length by over a quarter of an inch in width, of varying shades of gray or stone colour, the whole body finely mottled and variegated with black, gray, brown or pinkish markings, any one of which may predominate more or less in different specimens; many have a ruddy appearance, from the ground colour of the skin being a pinkish colour. The markings of these caterpillars consist of a conspicuous yellow band, mottled with orange, beneath the spiracles; a sub-dorsal interrupted stripe of velvety black blotches washed with orange, sometimes very conspicuous, but at others almost obliterated; a medio-dorsal line of yellow almost continuous from the head to the apex of the anal flap. This line expands into four or sometimes five conspicuous yellow spots, situated in the centre of the middle segments. These spots are always present on segments four to seven, those on five and six being the largest. There is also occasionally a spot on segment three. The supra-stigmatal area bears on each segment, except the head, a diagonal, blackish, curved, almost S-shaped, mark, the lower end of which incloses the black spiracle. These marks form a wide, but on some specimens distinct, sinuous band between the sub-dorsal stripe and sub-stigmatal band. On segment 12 the sub-dorsal stripes meet and form a black, velvety patch, somewhat like the letter W, with the lower part filled in. Behind this, on segment 13, and the posterior third of segment 12, is an orange or pale patch sharply defined anteriorly against the straight edge of the velvety patch on segment 12. The ventral surface is paler than the dorsal and glaucescent. Head round, deeply cleft at summit, testaceous, coarsely mottled with brown or reddish markings. In the centre of the face are two curved, black stripes which, starting from the summit of each lobe of the head and converging, meet above the frontal triangle and then run down to the base of the antennæ. Thoracic feet testaceous; prolegs concolorous, bearing testaceous chitinous plates at the base exteriorly; claws blackish.

When full grown these caterpillars burrow a short distance into the ground and form a smooth oval cell, in which they change into the chrysalis or pupal stage, when they are of a bright chestnut brown, about three-quarters of an inch in length. The anterior segments, following the rounded head parts and to the tips of the wing covers, are cylindrical, but the six remaining segments, as has been noticed by several correspondents, are capable of movement. These segments diminish in size to the tip, which is armed with two slender black spines, which lie so close together as to appear as one, unless closely examined with a magnifying glass. This stage for the second brood, of which the moths emerged in August and September, was from 20 to 23 days."

HABITS.

Cut-worms, of which there are many varieties, are naturally nocturnal in their habits, lying hid by day just beneath the surface of the soil and coming out at night to feed. Most cut-worms also are non-climbers, naturally.

When they occur in large numbers, however, they change their habits somewhat and assume the army-worm habit of travelling in hordes and feeding by day as well, owing to the reduced food supply consequent upon their ravages, and for the same reason many non-climbers acquire the habit of climbing trees and bushes in search of food. The following account, which I wrote for Dr. Fletcher, is a succint account of the infestation and habits during last year:—

Regarding the cut-worm outbreak which occurred in this Province last summer, it might appropriately be characterised, on account of its suddenness, extent, and the myriads of individuals, as a veritable plague. I have not been able to ascertain how far south and east the plague extended, but it may safely be said that the States of Oregon, Washington and Idaho, and the whole of the Province of British Columbia, as far north as any reports were obtainable from, were infested. The first report to this Department was made by Mr. Tom Wilson, in the middle of July. He stated that the potato tops on Lulu Island were being devoured by some insect, but which, in spite of diligent search, could not be detected. Suspecting the cause, I advised looking for the culprit at night with lanterns; this was done, with the expected result. Not suspecting the infestation to be widespread, I merely recommended the treatment usually followed. However, a few days later, reports began pouring in from all parts of the Province, and bulletins were issued from time to time recommending the remedies you prescribed in your reports. The sweetened bran poisoned with Paris green, when it was used in accordance with directions, was found to be the most effectual.

Unfortunately, the supply of Paris green, not only in this Province but in the adjoining States and California, was not equal to the demand, in consequence of which, great havoc was wrought before a supply could be received from the East. When at length a supply was obtained, many of the caterpillars had passed into the chrysalis stage. The numbers of the caterpillars were simply incredible; in places the surface of the ground was described as a moving mass, and where they were poisoned in any numbers the stench was unendurable. On account of their numbers and consequent scarcity of food, they soon relinquished their nocturnal and non-climbing habits, and myriads could be seen crossing the dusty roads in the heat of the day in search of food; fruit trees, if not protected, were ascended, and the fruit, as well as the leaves, was consumed. Naturally, green succulent food was first consumed, but, as that got scarce, anything and everything was attacked. After consuming the tops of potatoes, turnips, onions, carrots and such things, the tubers were attacked. Potatoes which were well matured and those which were quite late escaped with the least loss; carrots and onions suffered very severely. The potato crop was probably reduced one-third, and other root crops in proportion. The second crop of clover was almost entirely destroyed. Grain was attacked, but no material loss resulted.

In August the caterpillars began to enter the chrysalis stage, and their ravages then began to be, of course, much lessened. Altogether, the period of activity lasted from about six weeks to two months. A number of caterpillars which I had in captivity were all in chrysalis by the end of August or the beginning of September. A number of these emerged as moths in October, but I have not been able to discover any eggs. A large number of the moths were also caught in the grass-cutters used on the lawns surrounding the Government Buildings here. My observations have led me to the following conclusions, viz.: that the cut-worms appeared in such abnormal numbers owing to the scarcity or absence of their natural enemies, parasites, birds, etc.; that where fowls were allowed to roam the plague was reduced to a minimum; that poisoned bran, when used as directed, is most efficacious; that parasites are increasing and will probably reduce the numbers of cut-worms next season; that from good services rendered in devouring great numbers of these cut-worms, the crow, frequently destructive to potatoes and other crops in this Province, has this year done the farmers good service.

REMEDIES.

Early in June the following was published in a Bulletin issued by this Department:—

The Moth.

It would appear from the observations made by this Department, by the Rev. G. W. Taylor and others, that no authenticated case of eggs having been laid at the time the moths emerged last autumn in such numbers having been established, it is natural to suppose that many of the moths hibernated, and their appearance at this time, which is about the same time (a little earlier perhaps) as they appeared last year, warrants the belief that these are the parents of the brood which does the mischief. Hence it is of the utmost importance that as many of the moths as possible should be captured and destroyed. To effect this, the following very simple and inexpensive device, recommended by Dr. Fletcher, is all that is needed, viz., lantern traps.

These can be easily made by placing a lighted lantern at night over a shallow tin dish, containing about an inch or two of water with a little coal oil on the surface. The moths will be attracted by the lantern, and after flying against it will fall into the tin dish, where they will come into contact with the coal oil, and even should they struggle out again they will soon perish, as the oil will quickly run over their bodies and suffocate them, by stopping their breathing pores.

The Larva.

The following recommendations by Dr. Fletcher for the destruction of the cut-worm are re-printed from the emergency bulletins issued by this Department last year. The use of the poisoned bran remedy is strongly recommended, it having proved to be most efficacious.

Large numbers may be destroyed by placing between the rows of an infested crop, or at a short distance apart on infested land, bundles of any succulent weed or other vegetation, which have been previously poisoned by dipping them into a strong mixture of Paris green (two ounces to a pailful of water). The cut-worms eat the poisoned plants, then bury themselves and die. In hot, dry weather these bundles should be placed out after sundown, and a shingle may be laid on each to prevent fading.

Striking results have been obtained during the last two years by putting along rows, or at the base of such plants as tomatoes and cabbages, a small quantity of the following mixture, which is mentioned by Prof. J. B. Smith's excellent new Manual of Economic Entomology:

Thoroughly mix together in a dry state 50 pounds of bran and 1 pound of Paris green; then add water a little sweetened with sugar until the whole is thoroughly wet, but not sloppy. Prof. Smith says:—

"This mixture is extremely attractive to cut-worms, being preferred to plants in all the instances which have come under my notice. It takes about ten pounds of this mixture to an acre of potatoes, as ordinarily planted."

The same mixture has been used dry by F. A. Sirrine, of Geneva, N. Y., with, he claims, even better results than the wet mixture, which is apt to get mouldy.

Hand picking or digging up the cut-worms whenever a plant is seen to be cut off should, of course, always be practised.

Dr. Fletcher, in a communication dated 23rd July, 1900, says that "the pest is *Peridroma saucia*, the variegated cut-worm. * * * Spraying does not seem to be the most satisfactory way of applying poisons for cut-worms. The poisoned bran remedy gives really remarkable results, and is actually more attractive than green vegetation. I find that the best way to prepare this is to wet the bran with water slightly sweetened; then dry this by mixing in more bran until the whole is apparently dry again, but, as a matter of fact, there will be sufficient imperceptible moisture to make the poison adhere. When the bran is perfectly dry, Paris green falls quickly to the bottom and is difficult to mix with the bran."

Paris green being a deadly poison, care should be exercised to keep it out of the reach of children and domestic animals.

PREVENTIVE MEASURES.

Preventive measures consist of: Clean culture, by which all vegetation is removed upon which the young caterpillars could feed in the autumn, or which would attract the moths to lay their eggs.

Cut-worms are heavy-bodied insects unable to climb over smooth surfaces; therefore, surrounding a plant or tree with a band of tin, or even paper in the case of such plants as cabbages and tomatoes, is an efficient means of protection. Tin bands may easily be made by taking pieces of tin six inches long by two and a half inches wide and bending them around a spade or broom handle so as to form short tubes. In placing them around a plant the two ends can be sprung apart to admit the stem, and then the tube should be pressed a short distance into the ground. I have found this a useful means of disposing of tomato and other cans. To prepare these easily, the cans need only be thrown into a bonfire, when the tops and bottoms fall off and the sides become unsoldered. The large piece of tin can then be used whole or may be cut down the centre with a pair of shears, so as to form two bands. It may be well to mention here that the two remedies so often mentioned in newspapers, salt and lime, have proved quite worthless in our experiments for preventing cut-worm injuries.

Traps made of disused tins, short sections of drain pipes and similar things sunk in the ground and covered over with boards, allowing sufficient room all round for the caterpillars to creep under, will capture numbers of the pests. In the grounds of the Government Buildings large numbers took refuge at night in the earthenware receptacles for the water taps and could not get out again. Even ditches with steep smooth sides prevent a great many from getting from one part of the field to another, and when the ditch has water in it it is quite effectual.

Mrs. J. S. Place, of Dog Creek, wrote last year as follows:—

"We had an acre and a half of potatoes and the cut-worms ate all the leaves off in two weeks, leaving only the stalks. When they had finished eating off the potatoes they began to cross the fence into the vegetable garden. The fence was just covered with them. However, we cut a ditch through the garden and turned on water. They tried to cross and were drowned by thousands. Some few managed to get over on straws and bits of twigs."

PLANTS POISONOUS TO STOCK.

As noted in my introductory remarks, many cases of cattle poisoning have been reported to the Department, and in every case where it has been possible, the fatality has been traced to water hemlock (*Cicuta sp.*). The chief difficulty experienced in arriving at any definite conclusion, when cases of supposed poisoning have been reported, is the absence of definite data and the neglect to secure the contents of the dead animals. In all cases where this has been done, the cause of death has been easily determined. In the case of Mr. Neil Beaton's horses, mentioned previously, there was absolutely nothing to go upon save Mr. Beaton's statement, made from memory, which was about as follows:—

"Horses all died lying partly on the side; forelegs doubled under, or stretched straight out; noses close to throat. Seem to have died instantly, without a struggle. All seem to go away from water, which apparently stimulated the poison or accelerated death. Water seemed to choke them, and the laboured breathing could be heard for a long distance. All happened during August 1st to 15th. One of the animals was a little swollen around the glands of the throat, but in the others nothing of the kind was observed"

In addition to this statement, I learned that some of the animals which were found dead seemed to have dropped in their tracks, as if from sudden suspension of the action of the heart.

Mr. Beaton also reported the death of several cows, but these were in an enclosed pasture, and from the description given and the fact that a swamp is in the pasture full of *cicuta*, I had no difficulty in tracing the cause of death to this poison. From the description furnished me of the symptoms before death (no post-mortems having been held), I could trace the fatality to none of the poisonous weeds I know, or have seen described; and the vegetation on the range, except possibly mushrooms, showed nothing of a poisonous nature. On my return, I compared the symptoms with those described by mushroom poisoning, and, curiously enough, they coincided in some respects, and the question has arisen in my mind, could these horses have possibly been poisoned by eating poisonous mushrooms? Unfortunately, the idea had not occurred to me whilst walking over the range, or I should have secured some specimens of the mushrooms, which grow in abundance under the pine trees, and resembled, as near as I can remember, *Amanita phalloides and Amanita Muscarina.*

The following copy of a letter which appeared in the "Oregon Agriculturist" of the 15th December, and correspondence ensuing thereon, with reference to mushroom poisoning, will be found of interest:—

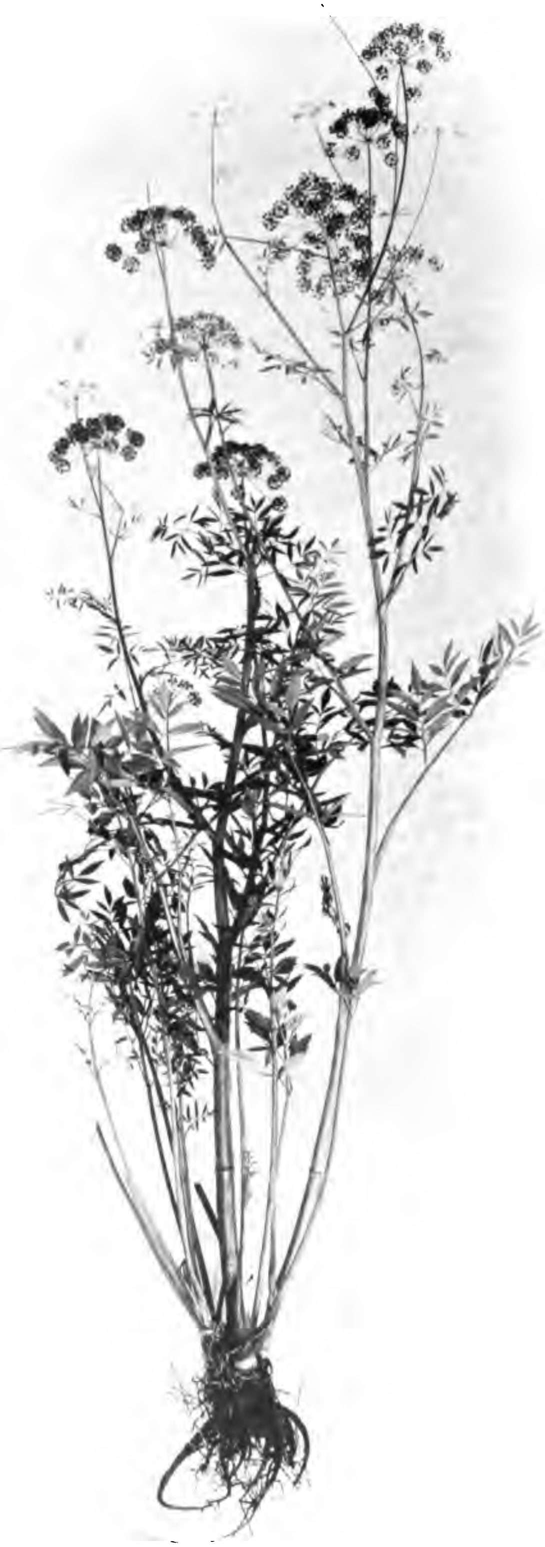
Goats Poisoned by Mushrooms.

"TO THE EDITOR:—Do you know of any remedy for goats when poisoned on toadstools, or a mushroom-like growth on old stumps? When first poisoned they stagger and circle around in one direction, froth at the mouth, finally get down, and may lie for two or three days before dying. As there is ample time to doctor them, I would be much obliged to you if you can find and publish a remedy in your paper.

"WM. MCRAE,
"*Lane County, Oregon.*"

ANSWER BY THE EDITOR.

"Unless it has been recently discovered, we think there is no remedy known for poisoning by mushrooms, especially when the poison is the substance called "phallin." There is a less poisonous substance called muscarine in some mushrooms or toadstools, which is counteracted in human beings by hyperdermic injection of atropine. When phallin is administered to cats and dogs, death follows in four to seventy-two hours. A prominent Chinaman in Washington died on the fourth day after eating poisonous mushrooms. If anyone knows of any remedy for either kind of mushroom poisoning which can be used in the case of goats, we will be pleased to hear from him."



PURPLE-STEMMED WATER HEMLOCK

(Cicuta Douglasii).

(Grown by J. R. Anderson from roots from Sumas.)

REPLY BY DEPUTY MINISTER OF AGRICULTURE.

"VICTORIA, B. C., January 4th, 1901.

"*Mr. Wm. McRae, Lane County, Oregon.*

"SIR,—I notice in the 'Oregon Agriculturist' of the 15th ult., a letter from you regarding the poisoning of goats by mushrooms. The question of animal poisoning has been engaging my attention for some time, and I have been working in conjunction with Prof. Chesnut, of the United States Department of Agriculture, on the subject. Some time ago a report was sent to me from Kamloops that many valuable horses had died on a range near that point with symptoms of poisoning. It was late in the season, and I could find nothing, on investigation, except what I believed to be some poisonous mushrooms, and I was rather inclined to the belief, from the description given me of the symptoms before death, that they were cases of phallin poisoning. The question has never been settled, as the owner, unfortunately, did not keep the contents of the stomachs for analysis, and I am interested to know whether you ascertained for certain that your goats really do eat these mushrooms or toadstools. The symptoms you describe resemble those of muscarine poisoning, the treatment for which is given by Mr. Chesnut as follows:—

"'The treatment for poisoning by *Amanita muscaria* consists, primarily, in removing the unabsorbed portion of the amanita from the alimentary canal, and in counteracting the effect of muscarine on the heart. The action of this organ should be fortified at once by the subcutaneous injection, by a physician, of atropine, in doses of from one-hundredth to one-fiftieth of a grain. The strongest emetics, such as tartarized antimony or apomorphine, should be used, though in cases of profound stupor even those may not produce the desired effect. Freshly ignited charcoal, or two grains of a one per cent. alkaline solution of permanganate of potash, may then be administered, in order, in the case of the former substance, to absorb the poison, or in case of the latter, to decompose it. This should be followed by oils and oleaginous purgatives, and the intestines should be cleaned and washed out with an enema of warm water and turpentine.

"'Experiments on animals poisoned by the fly amanita and with pure muscarine show very clearly that when the heart has nearly ceased to beat it may be stimulated to strong action almost instantly by the use of atropine. Its use, as thus demonstrated, has been the means of saving numerous lives. We have in this alkaloid an almost perfect physiological antidote for muscarine, and, therefore, in such cases of poisoning, its use should be pushed as heroically as the symptoms of the case will warrant.

"'The presence of phallin in *Amanita muscaria* is possible, and its symptoms should be looked for in the red colour of the blood serum discharged from the intestines. Its treatment, which is difficult, is discussed under *Amanita phalloides.*'

"I hope to be in Portland to attend the meeting of the North-West Fruit Growers Association on the 5th prox., where perhaps I may meet you.

"I have the honour to be,
"Sir,
"Your obedient servant,

"J. R. ANDERSON,
"*Deputy Minister of Agriculture.*

"P. S.—The treatment given is for human beings."

MR. MCRAE'S REPLY.

"FLORENCE, OREGON, March 1st, 1901.

"*Mr. J. R. Anderson.*

"SIR,—In reply to your letter, would say that I think it is a growth that grows on old rotten trees and stumps that kills our goats. I know they eat this growth, and it is the general belief of nearly all parties who handle goats that it will poison them. However, there is no mistake but that toadstools will poison them, and they seem to like the toadstool. I understand that Mr. F. Rogers, of Douglas County, would lose two and three goats in a night when they had browsed over land where toadstools grew. He knows for a certainty that these goats eat these toadstools and die from the effects; but they seem to die quicker and in greater agony than our goats do. If you should care to write to Mr. Rogers for further particulars, his address is Gardiner, Douglas County, Oregon. In our flock it is almost without exception a kid or a yearling that gets poisoned. Whether the older goats do not eat this poison, or whether, having a stronger constitution, they can eat it without bad effects, I do not know. I had one fine buck poisoned, but saved it. First I bled it in the corner of the eyes, next the nose; then I gave it belladonna pills about every three-quarters of an hour. I kept this up all day, and when I went to look at it next morning it was frothing at the mouth again, but I continued with the pills until well on in the afternoon of the second day, and saved the goat. The receipt I had said to use castor oil, and, I think, two drops of spirits of belladonna every thirty minutes; perhaps in using the pills I did not give large enough doses, and thus had to continue longer. I got another receipt from a party in Iowa recently, which said to give 6 oz. of epsom salts at one dose, and then give two drops of aromatic spirits of ammonia every two hours, and to keep the animal warm. Have not had a chance to try this yet. The trouble is we ranchers know nothing of poisons or medicine, and are thus compelled to work in the dark, unless we can get information from some reliable source.

"Thanking you for the interest you have taken in the matter,

"I remain, yours truly,
"WM. MCRAE."

Water Hemlocks.

Early this last spring, Mr. W. T. Smith, of Tappan Siding, reported the death of some of his cattle, apparently from poisoning. I immediately asked Mr. Smith to send me some of the contents of the stomachs. On receipt of these, I found large pieces of undigested portions of the roots of water hemlock, which I pronounced to be *Cicuta Californica*, and advised Mr. Smith, as follows:—

"Hemlock poisoning is quite common in this Province and in the adjoining States, and it almost invariably occurs in the early spring months, before there is much green feed, and when the ground is soft. At such times cattle in search of food will pull up the hemlock by the roots when plucking at the leaves, and eat the whole plant. There are several varieties of hemlock, all equally poisonous; yours is probably *Cicuta Californica*. Cattle have even been known to be poisoned from drinking water contaminated by the juice of roots which have been crushed by being trampled upon.

"Since there is no remedy after the poison has been fully absorbed, it is evident that preventive measures are alone to be relied upon; therefore, you should keep your animals away from infected areas, and watch and dig up all the plants you find in the pasture. If discovered in time, an animal may sometimes be saved by copious doses of melted lard or grease, which tends to retard the absorption of the poison in the stomach and also facilitates its expulsion through the intestines.

"The flower of the water hemlock resembles a carrot flower."

I sent some of the undigested portions to Professor V. K. Chesnut, Assistant, Department of Botany, Washington, D. C., who replied as follows:—

"The specimen had completely decomposed when it arrrived at Corvallis, but enough of the odour remained to convince me that it was the root of one of the water hemlocks; I could not say which species. I doubt, however, if it was *C. Californica*, but think that it is most probably either *C. Douglasii* or *C. vagans*, both of which have figured in an article published in the last Year Book, a copy of which has just come to hand. These two species vary a great deal in their character, according to the nature of their habitat. I found specimens of *C. vagans* in Oregon which had a very great number of fine rootlets that had a very small root stalk. Since receving your letter, I have received clippings from two British Columbia papers containing a somewhat lengthy statement in regard to the poisonous properties of the water hemlock, and which were evidently given out by yourself. I concur in all that is said, and believe that I can add very little information in addition. You have, however, seen the article on Wyoming water hemlock which is contained in the preliminary report on stock-poisoning plants of Montana."

Following is the article referred to, and which is entitled "Some Poisonous Plants of the Northern Stock Ranges":—

General characters.—The local species of water hemlock are the plants best known throughout the whole of the northern stock regions as poisonous to stock. These are members of the genus *Cicuta*, belonging to the carrot family. There are at least three distinct species of this genus in the North-West, the fleshy roots of which, under the erroneous name of "wild parsnip," are rapidly fatal to man or beast, if eaten even in small quantity.

All are alike in being smooth, generally erect, perennial herbs, 3 to 8 feet high, with one or more upright hollow stems, numerous branches, mostly bipinnate leaves with lance-like and serrate-edged leaflets, 1½ to 4 inches long, and terminal umbels of small, white, or greenish-white flowers. The seeds, and especially the fleshy roots, together with the geographic distribution of the plants, serve to distinguish the species.

Species and their distribution.—The most widely known member of the group in the United States, the American water hemlock (*Cicuta maculata*), is probably the most deadly plant native to this country. An account of its poisonous character may be found in the Year Book of the Department for 1896, pp. 142-144.

A very similar species (*C. virosa*), which is equally poisonous, is well known throughout Europe. Both of the latter species, although fatal if eaten by animals, are best known as being dangerous to man. Children especially are killed by eating the fleshy rootstocks in the early spring, when they are most apt to be exposed by being washed or frozen out of the soil. The American water hemlock is abundant in the more humid eastern part of the United States, but apparently it does not extend very far into the drier portions of it, which are considered in this paper.

Several western species are best known as stock-poisoning plants. In Wyoming, and probably throughout all the adjoining States, the eastern plant is very largely, if not entirely, replaced by the Wyoming water hemlock (*C. occidentalis*), a not very different plant. The purple-stemmed water hemlock (*C. Douglasii*), as well as the Oregon species (*C. vagans*), is native in springy and boggy places and along streams on the humid western coast. It is not so widely distributed as *C. vagans*, but is well known as a poisonous plant in Washington and in British Columbia. The Oregon water hemlock is widely distributed from Northern California and Nevada to Washington and Idaho, but is most abundant in Oregon.

The purple-stemmed species differs from the Wyoming plant in having a purple instead of a green stem, smaller and more numerous roots, and various minor characters, which are of interest from a scientific point of view only. The eastern species has short, spindle-shaped or oblong, tuber-like roots, which are about an inch or two in length. All grow in damp ground, either along creeks and ditches or in low, marshy places, especially along the banks of coast rivers almost down to the salt water, and frequently in meadows which are cut for hay.

Odour.—Like most of the members of the carrot family, to which the water hemlocks belong, they have a peculiar, penetrating odour and taste, due to the aromatic oily fluid which is found throughout the plants, especially in the roots and seeds. It is probably on account of this odour that the plants are usually compared with the parsnip, which is the only commonly known fleshy-rooted member of the carrot family possessing a similar odour. In the case of the water hemlocks, however, the odour is more decidedly musky and much more disagreeable. The parsnip has one large, fleshy tap-root, and never becomes poisonous when growing without cultivation. The water hemlocks have a cluster of fleshy roots, which are highly poisonous, the oily fluid in them containing a highly virulent substance, which is probably the same in all the species.

Roots.—The roots are said to have a benumbing effect upon the tongue after long chewing. Unfortunately, however, the first taste is somewhat sweet, and not sufficiently disagreeable to deter children, and even men who are in search of wild aromatic roots, from quickly eating a sufficient quantity to produce fatal results. They are generally eaten by mistake for other wild-growing roots of the carrot family, which have a somewhat similar taste. Cases of human poisoning have been recorded against all of the species of the North-West, with the exception of the purple-stemmed one. In the spring of 1900, as many as four people were killed in Montana by eating the roots of the Wyoming species. The poisonous properties of all the species are well known to the Indians, who occasionally use them for suicidal purposes. One such case, which recently occurred in Nevada, and was investigated by the Department, was due to the Oregon species.

In the case of each of these plants, the root is the part best known to be fatal to stock, but the tops are also poisonous under some conditions. After long-continued rain the roots are so loosened that they can be pulled out of the ground without difficulty by stock while grazing. In some cases the oil has been swallowed with water found in marshy places, where the roots have been trampled upon. Horses that are used for ploughing virgin soil in wet land are not infrequently killed by eating the exposed roots. Poisoning from the roots takes place in winter and early spring, and observations seem to indicate that the roots are poisonous only at that time of the year. A piece of the Oregon root about the size of a walnut is, according to Prof. Hedrick, sufficient to kill a cow. Animals may be killed in the pasture by eating the young leaves or stalks of plants, less than a foot or two high. The basal portions of such plants are, at least in the case of the Wyoming species, much more poisonous than the tops.

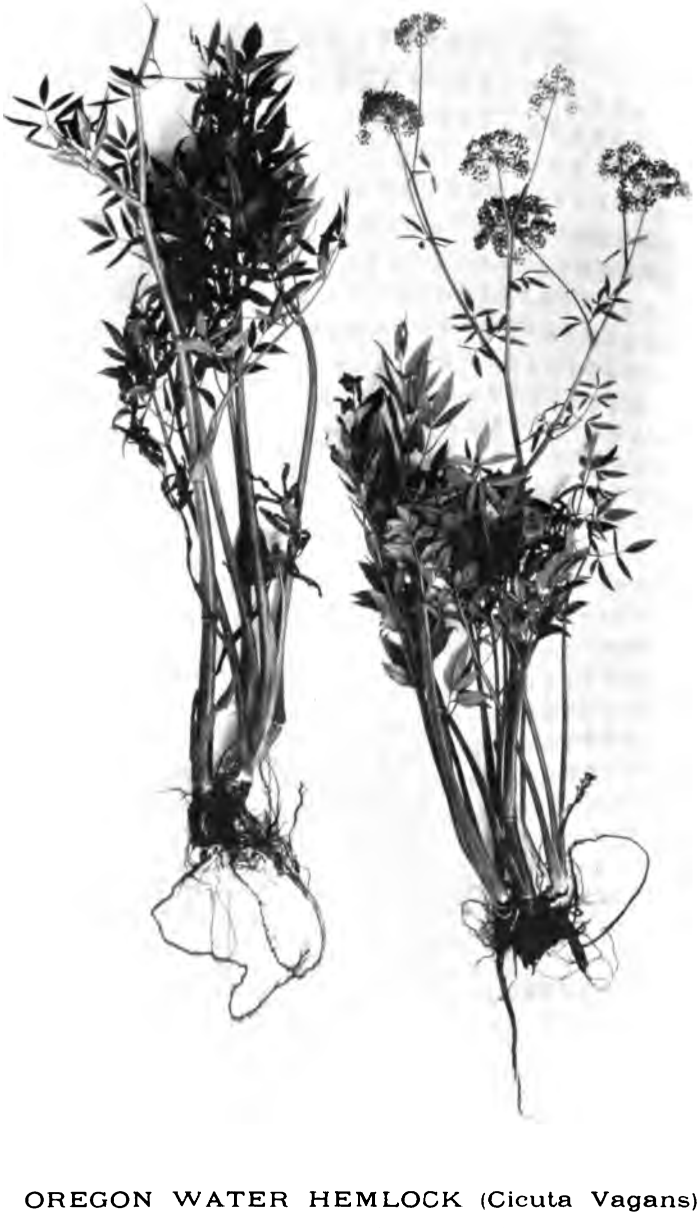
Leaves, Seeds and Stem.—The green leaves from the taller plants are not nearly so dangerous as the lower portions. Seeds on plants cut with wild meadow hay, and perhaps to a lesser extent the leaves and stems of such plants, have caused a very considerable loss of stock in the Dakotas and Montana. Such hay is very much more apt to be fatal if fed in boxes, for the seeds, which are easily detachable, are not then lost when the plants are tossed about by the animals in eating, but accumulate at the bottom of the box, and are therefore more apt to be eaten.

Damage Caused.—No systematic attempt has ever been made to obtain statistics showing the extent of the damage caused by the water hemlock in the North-West. That it is considerable may be judged from the fact that so much attention has been paid to the plants by various experiment stations. One man on the Sprague River, in Oregon, has recently spent much time and money in an attempt to eradicate the plants from his range, and Prof. Hedrick has stated that an estimated death rate of one hundred cattle per annum was low for that State. During an investigation of the poisonous plants of Montana in the months of May and June, 1900, Dr. E. V. Wilcox and the writer noticed 36 cases of water hemlock poisoning among cattle, 30 of which were fatal, and 105 cases among sheep, 50 of which were fatal. It will thus be seen that the death rate was very high. The above deaths represent a loss of over $4,000, but this is only a fraction of the entire loss in Oregon and Montana for that year.

Symptoms of Poisoning.—The symptoms of poisoning resulting from the accidental eating of any of the poisonous parts of any of the water hemlocks agree well with each other, and also with those obtained in experimental ways. The effect of the Oregon plant has been noted by Professors H. T. French and U. P. Hedrick, in the case of a yearling calf that ate two of the roots one morning at about 9:15 o'clock. At 10:25 o'clock the muscles of the flanks began to twitch, the eyes watered and the animal became excitable. Its temperature had risen to 104°. There was also a marked increase in the quantity of urine voided, a symptom which was prominent until death. The first spasm took place at 10:45. There was then a marked activity of the sweat glands, and the rate of breathing was doubled. At 11:30 o'clock the calf had another spasm, and this was followed by others in rapid succession until death ensued at 11:45. Other observers have noticed other symptoms, the most prominent of which are an increased flow of saliva, bloating, severe pain in the stomach, and widely-dilated pupils. Death takes place within a few, sometimes within one and a half, hours after the plant has been eaten.

Effect of the Poison as shown by post-mortem.—Post-mortem examination nearly always reveals the characteristic musky odour, and often pieces of the plant, especially the root, in the stomach. These furnish the most conclusive evidence of the nature of the poison, for there seem to be no very characteristic lesions. The lungs and brain are often highly congested, and one authority—Prof. L. H. Pammel—cites a correspondent who states that in the case of a cow killed by eating some roots the mucous membrane of the stomach was black, and as easily scraped off with a stick as if it had been scalded.

Nature of the Poison.—The American water hemlocks have not been carefully analyzed, but probably all of them contain the peculiar compound known as cicutoxin, which was first isolated by R. Boehm from the European plant. Two-tenths of 1 per cent. of the pure substance was obtained from the fresh root, and 1½ per cent. from roots which had been dried. As described by Boehm, it is an uncrystallizable, resinous body, with an acid reaction and a disagreeably bitter taste. It is very soluble in boiling water and in diluted alcohol. This substance is not an alkaloid nor a member of any extensive class of poisons, but belongs to a small group of very poisonous compounds known as toxins. Andromedotoxin is a similar



OREGON WATER HEMLOCK (Cicuta Vagans).

(Grown by J. R. Anderson from roots from Oregon.)

substance which is found in many well-known plants belonging to the heath family (*Ericaceæ*), some of the members of which, such as sheep laurel (*Kalmia angustifolia*) and calf kill (*Leucothöe catesbaei*), are well known along the Atlantic Coast as poisonous to young stock. The fatal dose of cicutoxin for cats is 50 milligrams for each kilogram of body weight when administered through the mouth, and 7 milligrams per kilogram when injected hypodermically. One hundred milligrams (about 1.4 grains) will kill a cat weighing about two kilograms (4.4 pounds), if fed to it. The prominent symptoms are very similar to those produced when the plant itself has been eaten, and consist of salivation and constant trembling of the limbs, with cramps and convulsions, finally ending in death.

Remedies sometimes used.—Cases of poisoning of stock by water hemlocks are very difficult to handle, both because the animals generally become wild and unmanageable, and because the action of the poison is so rapid that the animal is usually dead when found. Tannin is mentioned by Fröhner as a chemical antidote, but it must be used together with chloral or with hypodermic injections of morphine to offset the physiological action of the poison already absorbed into the system. Animals generally die after eating fatal doses, but they are able in some instances to vomit the excess and recover. Stockmen occasionally save their animals by administering two or three daily doses of melted lard.

Necessity of eradicating the plant.—There being no effective rational antidote for use in water hemlock poisoning, stockmen should become thoroughly acquainted with the plants in all of the stages of their growth, in order that they may take the proper steps to eradicate them from their ranges or prevent their animals from eating them. Repeated ploughing will kill the plants, and repeated mowing may do so. Whenever practicable, the roots should be grubbed up, preferably in spring, and piled together in some out of the way place or burned. Meadows rich in water hemlock should not be used for hay, unless previously freed from the plants by hand-pulling or by removing the seeds. Hay containing small amounts of the seeds might be fed from the ground, but not in boxes. Regular drinking places, and especially inclosed pastures, should be kept scrupulously free from the plant.

EXPERIMENTS.

Experiment 1.—The upper portion of non-flowering plants less than a foot in height were gathered June 3rd, and having been kept turgid in a tin box, were fed June 4th and June 5th. In the first case the material was fed out of hand in small pieces to a 1-pound rabbit until after ten minutes it had eaten all of sixteen leaves. The remainder of 60 grams was then placed in the cage, and after forty-five minutes 12½ grams in all had been eaten. The rabbit ate the first portion quite readily, but it had practically refused to eat more of the cicuta, even when coaxed, at the end of half an hour. It was then decidedly uneasy, and its respiration was unusually rapid. Ten minutes later it had voided a considerable amount of urine, which relieved it from most of its symptoms, but five minutes later still its temperature was 102.4°, that of a check being 100.8° F. A little irregularity of breathing was noted three and one-half hours after the beginning of the experiment, but the next day the rabbit seemed perfectly normal.

Experiment 2.—In the preceding experiment, all of the aerial portion of the plant was used. In this the thick, whitish basal portions of the leaves, which were thought to be more poisonous on account of their more oily appearance and pungent taste, were discarded. Fifty grams were offered to a 1-pound rabbit. The amount which had been eaten five hours afterwards was 12 grams or more, as was ascertained by weighing the uneaten part and making proper allowance for the evaporation of water, which was determined by weighing a check amount of equal weight that had been exposed to practically the same conditions. No effect whatever was produced.

Experiment 3.—On June 9th, 50 grams of the fresh tops of the non-flowering plants (1 to 1½ feet high) exclusive of the white basal portions, was eaten by a rabbit weighing about 1½ pounds, without causing any marked symptoms.

These experiments do not afford sufficient data upon which to base any very definite conclusions, but it seems certain that the basal portions of the leaves of young plants is more toxic than the green foliaceous part, and it may be safely assumed that the leaves of the older plants are likewise less toxic. When the stems are older, they are not so tempting to stock in Montana, because at that time there is an abundance of wholesome fodder, and it may be that the mere failure of stock to eat the stems in that stage has given rise to the idea that the tops of the older plants are not poisonous. It is more likely that the older stems, containing as much oil as they do, are poisonous, but to a much less degree than the root, which is responsible for a large percentage of the cases of water hemlock poisoning which occur in the State.

Experiment 4.—The remedies which were tried in cases of poisoning by this plant include morphine and chloral hydrate, combined in a few instances with emptying the stomach by means of rumenotomy (paunching) and the use of cathartics. Potassium permanganate was not tried in any of these cases, for the reason that the violent physiological effects of the poison were already sharply pronounced when the animals were seen. It was thereby evident that most of the poison had already been absorbed out of the stomach, and could, therefore, not be affected by permanganate of potassium in the stomach.

Two sheep were given morphine hypodermically in quarter-grain doses at intervals of five minutes. No decided effects of the morphine were observed until after the third dose, when the sheep became gradually calmer. After receiving five doses, both sheep lay down in a partly stupefied condition, from which they did not arouse for several hours. These sheep ultimately recovered from the poisoning, although its effects were noticeable for four or five days.

Experiment 5.—An experiment was tried with choral hydrate as an antidote for poisoning by water hemlock. One sheep was given one-half ounce of chloral hydrate, in three equal doses, at intervals of ten minutes. The effect of this substance was not so immediate as was that of morphine, but seemed to be otherwise very similar. The sheep finally passed into a stupor similar to that produced by morphine, from which it emerged after about two hours. The sheep did not manifest any further violent symptoms as the result of the poisoning, but it did not recover its appetite, and after drooping about for three days, finally died. It would seem in this case the violent effects of the poison were not counteracted quickly enough to enable the animal to make a final recovery.

Experiment 6.—In one case where four cows were poisoned with water hemlock, one of the number was seen when the first symptoms of poisoning began to be shown. The stomach was at once opened where the ordinary operation of paunching is performed, and the stomach contents were removed. A large enema of luke warm water was then given, followed by a drench of melted lard. No direct antidotes were given in this case. The animal, however, did not exhibit the most violent symptoms of the poisoning, and made a complete recovery after two days without any further care. The three other cows died before any treatment could be given. In one other case of poisoning from water hemlock, a cow was given two 1-ounce doses of chloral hydrate fifteen minutes apart, with very satisfactory results.

SYMPTOMS OF POISONING.

The symptoms of poisoning from this plant were most closely studied in sheep. The animals manifested signs of severe pain very quickly after the appearance of the first symptoms. In sheep, the first sign of the poisoning was usually an attempt on the part of the sheep to run away from the rest of the band, or to run in any direction in which it might happen to get started. There were also manifestations of great cerebral frenzy, accompanied by involuntary muscular movements which resembled to some extent the movements of animals when suffering from colic. The respiration was laboured and somewhat irregular, the pulse was wiry and intermittent. It is, however, a difficult matter in most cases to make reliable observations on this point, for the reason that an attempt to manipulate the animal always results in increasing the mental excitement and the violence of the muscular spasms. These spasms rapidly become more and more severe as the cerebral excitement increases, until the animal appears to be in an unconscious condition and dies in the most violent spasms. In some cases of cattle poisoned by this plant, the victims died within fifteen minutes after the first signs of poisoning had appeared. In other cases, among both sheep and cattle, where the first symptoms succeeded one another less rapidly, the animal lived for two or three hours, dying finally from exhaustion, apparently as the result of the violent muscular convulsions.

REMEDIAL AND PREVENTIVE MEASURES.

Water hemlock is to be considered as a dangerous, poisonous plant, especially as so large a percentage of the animals poisoned by it ultimately die, and because its action is so rapid that the possibility of treating a large number of simultaneous cases is practically precluded. It will readily be understood that, in any case where several hundred animals are poisoned at the same time, considerable skill will be required to administer even a simple treatment to each animal in time to prevent the fatal effects of the poisoning. But the difficulty is especially great when one has to deal with a plant like the water hemlock, of which a fatal dose may produce death in fifteen minutes. As already indicated, antidotes for poisoning from this plant may be applied with success, if the animals are noticed immediately after the first symptoms of poisoning appear. Too often, however, especially in the case of cattle, the poisoning is not discovered until it is too late to give any remedial treatment.

Permanganate of potash should be promptly administered, as previously recommended for poisoning by other plants. If violent symptoms are already apparent, give morphine or some other sedative hypodermically. In no case should these be administered by way of the mouth, if the permanganate has already been given. Morphine should be given in doses as follows: For adult sheep, 1½ grains; for cattle and horses, 3 to 10 grains.

The distribution of water hemlock is much less extensive in the localities where it grows than is that of death camas. It would seem, therefore, to be a comparatively easy matter to prevent sheep from grazing on areas where it occurs, at least during the spring and summer. It seldom happens that water hemlock is found along the whole course of the stream, or around the whole circumference of a lake. There are, in nearly every case, places free from it at which the sheep could be watered with safety. In case the water hemlock grows along the banks of the stream at points which are the most convenient watering places, it could here be exterminated with a moderate amount of labour. This can be done by repeatedly cutting it down, or in other ways. It is advisable to avoid the use of hay containing water hemlock. The plants should be removed from native meadows before mowing. Sheep herders should be thoroughly acquainted with the appearance of the plant, so as to be able to recognise it in any of its stages. An illustration of the value of such knowledge is found in the case of the herder who made several attempts to water his sheep at different points along the bank of a certain stream, with disastrous consequences in each case. A close observation would have shown that the same plant was the cause of the poisoning in all cases.

SUMMARY.

Water hemlock is widely distributed in Montana along water-courses and in swampy places, from the lowest altitudes up to about 7,500 feet. The roots have long been known to be fatal when eaten by stock, and cases of poisoning of stock have been reported from eating dry-seeded specimens in hay.

Our observations from May to July, 1900, showed that a number of cattle and sheep ate the young plants, including, in some cases, the roots, with fatal results in about 80 per cent. of the cases.

Our experiments demonstrated that the basal portions of the plants less than 1½ feet high were poisonous to rabbits, and that morphine and chloral hydrate are useful in counteracting the physiological effects of this plant.

In cases where large quantities of the plant, especially the root, are eaten, death results so quickly that remedial measures cannot be applied.

WEEDS.

The evil effects of weeds have been so often dilated upon that it seems almost superfluous to say anything further on the matter. The astonishing part of the question is the apparent complacency with which it seems to be viewed by those whose interests are most affected by it. Acts of Parliament are all well enough in their way, but unless united effort is put forth to sustain their provisions, and by example to insist that they are enforced, they are but of small avail. Prof. E. S. Goff, Horticulturist, University of Wisconsin, says:—"Our legislators have already come to the aid of the farmer in the battle with noxious weeds, and have enacted laws by which all owners of land may be compelled to prevent the seedage of the species that are supposed to be most detrimental. This throws the responsibility upon the farmers themselves. Will they unite to enforce these laws, or will they, through indifference or negligence, permit them to go unheeded? This is the question that each community must answer for itself."

Prof. Frederick V. Colville, Botanist, U. S. Department of Agriculture, says in his letter of transmittal of Bulletin No. 28, "Weeds and how to kill them":—"The direct loss in crops, the damage to machinery and stock, and the decrease in value of land due to weeds, amount, without question, to tens of millions of dollars each year—a loss sustained almost wholly by the farmers of the nation."

All who have heard Dr. Fletcher, the Botanist of the Central Experimental Farm, lecturing at meetings of Farmers' Institutes, cannot help but be convinced of the enormous loss the farmer suffers through allowing these pests to infest his farm. The following are the substance of some of Dr. Fletcher's remarks:—

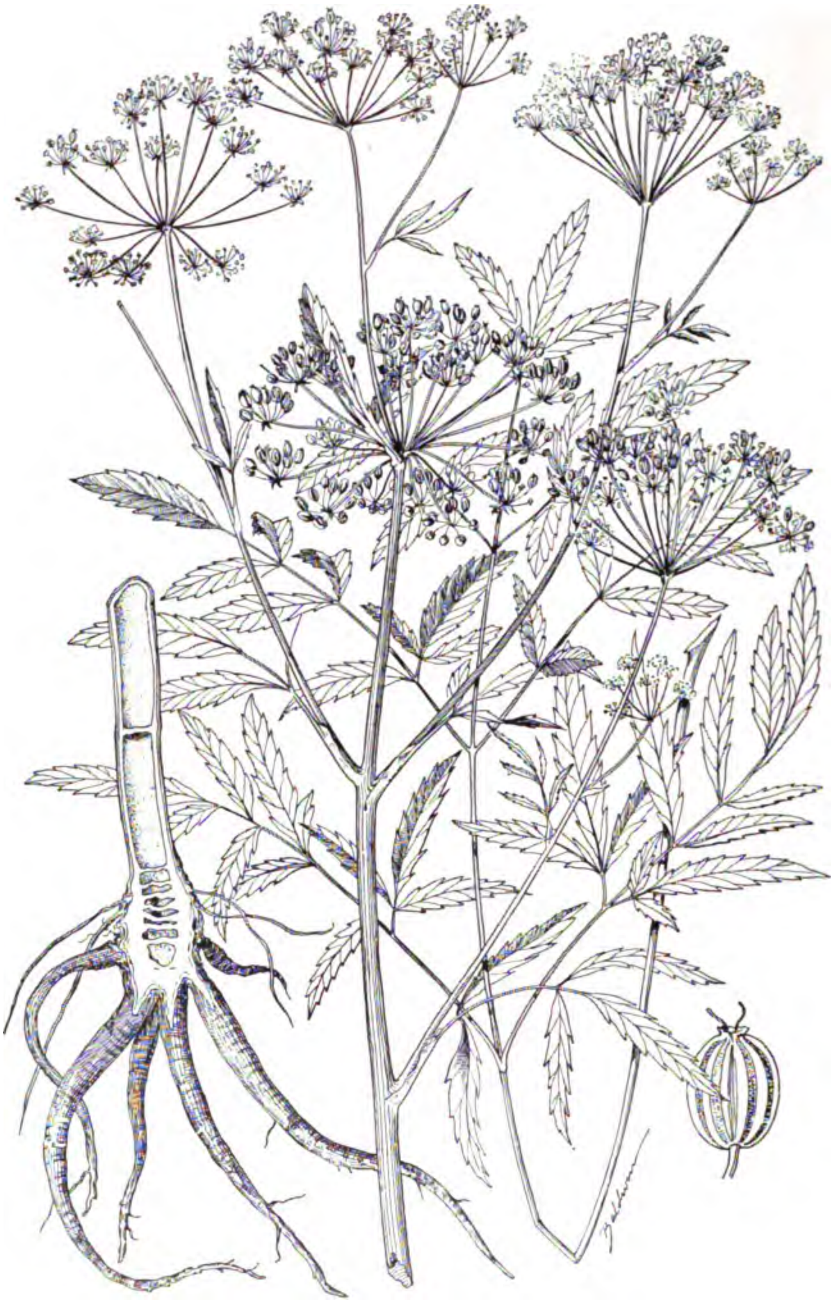
The best definition of a weed, however, was contained in one word: it is an "enemy," an enemy that must be got rid of, or it will get rid of the farmer; further, it must be got rid of at once, for one year's seeding means seven years' weeding. Farms are not yet so badly infested in the Territories as they are further east, where land has been longer settled. In Ontario it costs the farmer ten per cent. of his crop to fight against insects, and another ten per cent. to cope with fungi, such as smuts, mildews and rusts, to say nothing of weeds; and it will be the same in the North-West Territories if the farmers do not put forth every effort to prevent it. In the rich lands of the Red River Valley he had known wheat even reduced 50 per cent. in value in consequence of the prevalence of a very bad weed call ragweed, the seed of which was the same size and weight as the wheat itself, and could not, therefore, be either sifted or blown out easily from grain. It was, for this reason, very difficult to get rid of, and buyers did not care even to handle at all such wheat as had seed of this weed in it.

CLASSIFICATION OF WEEDS.

Weeds, like all other plants, may be simply classified under the three following heads:—Annuals, or one-year plants; biennials, or two-year plants; perennials, or many-year plants. In eradicating weeds, it is of the greatest importance to consider under which of these heads they come, because, in most instances, the treatment is simple and will be upon the general principles of preventing annuals and biennials from seeding, and perennials from forming new leaves, roots and under-ground stems.

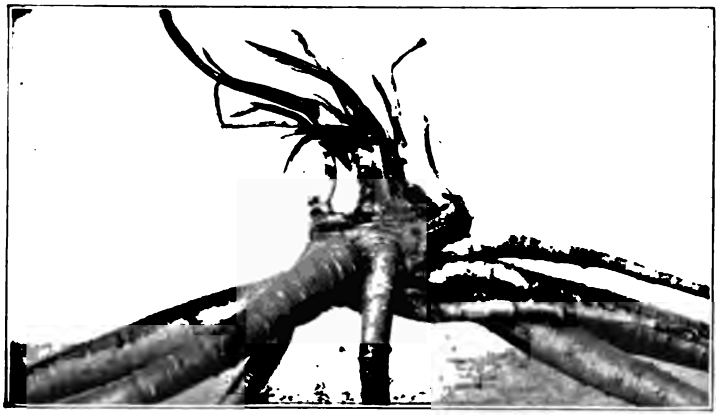
Annuals are those plants which complete their whole growth in a year. As a rule, they have small roots and produce a large quantity of seed. Examples of this kind are found in wild mustard, stink weed (called also "penny cress" and "French weed"), lamb's-quarters, wild buckwheat, purslane, ragweed, wild oats. There are also some annuals called "winter annuals," which are biennial in habit, that is, of which seeds ripened in the summer produce a certain growth before winter sets in, and then complete their development the next spring. Of these may be mentioned shepherd's purse, peppergrass, stink weed (mentioned above), Canada flea-bane and the blue bur.

Biennials are those plants which require two seasons to complete their growth, the first being spent in collecting and storing up a supply of nourishment, which is used the second season in producing flowers and seeds. Examples of these are burdock, false tansy, common evening primrose, and viper's bugloss or blue-weed.



WYOMING WATER HEMLOCK (*Cicuta occidentalis.*)

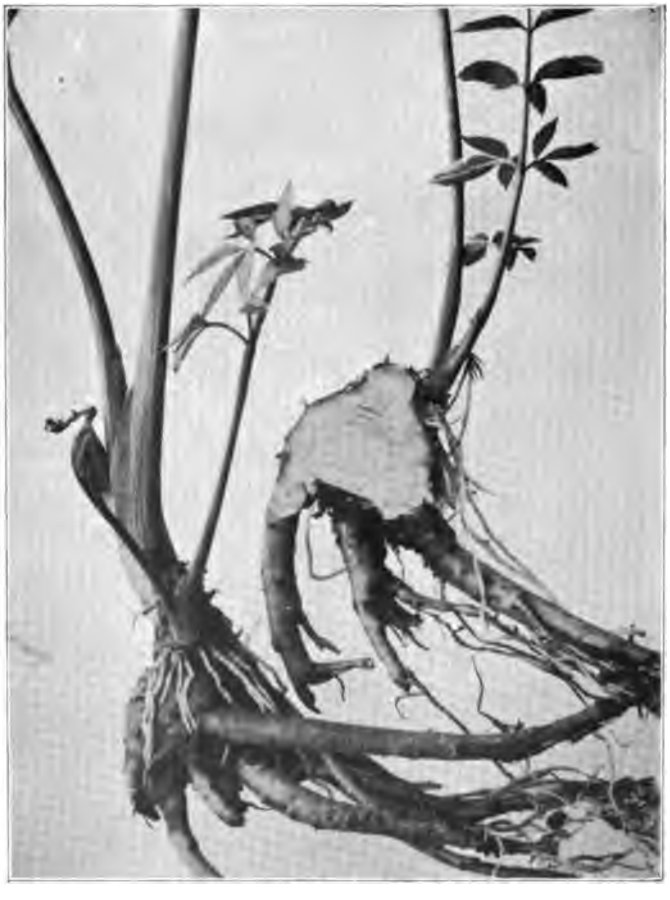
V. K. Chesnut and E. V. Wilcox, Bulletin 26. Division of Botany, United States Department of Agriculture.



WYOMING WATER HEMLOCK ROOT

(Cicuta occidentalis.)

V. K. Chesnut. Some poisonous plants. Division of Botany, United States Department of Agriculture.



OREGON WATER HEMLOCK ROOT

(Cicuta vagans).

(One-half natural size.) V. K. Chesnut. Some poisonous plants. Division of Botany, United States Department of Agriculture

Perennials are those plants which continue growing for many years. Perennial weeds are propagated in several ways, but all produce seeds as well. They have two distinct modes of growth, those which root deeply, and those of which the root system is near the surface. The most troublesome are those which extend long, under-ground stems deep beneath the surface of the ground, as Canada thistle, white-stemmed evening primrose, showy lettuce, and wild sunflowers. Representatives of the second class or shallow-rooted perennials are pasture sage, yarrow and couch grass. Some perennials extend but slowely from the root by means of short stems or offsets, but produce a large quantity of seed. Of these, ox-eye daisy, dandelion, goldenrod and yarrow are examples.

EXTERMINATION OF WEEDS.

In adopting a method of extermination, the nature of the plant to be eradicated must, first of all, be taken into consideration.

Any method by which the germination of the seed in the soil is hastened, and then the young plants are destroyed before they produce fresh seed, must in time clean land, however badly infested it may be with annual weeds. The seed of some annuals have great vitality, and will continue appearing for several years as fresh seeds are brought up to the surface by cultivation. Wild mustard and wild oats have been known to germinate after lying deep in the ground for twenty years.

Biennials must be either ploughed up or cut down before they flower. Mowing at short intervals will kill them; but a single mowing will only induce them to send out later branches, which, if not cut, will mature many seeds. Where ploughing is impracticable, this class of plants should be cut off below the crown of the root. For this purpose a spud or a large chisel in the end of a long handle (to obviate the necessity of stooping), is as convenient a tool as can be used.

Perennials are by far the most troublesome of all weeds and require very thorough treatment, in some instances the cultivation of special crops, to ensure their eradication. Imperfect treatment, such as a single ploughing, frequently does more harm than good, by breaking up the under-ground stems and stimulating growth.

There is no weed known which cannot be eradicated by constant attention, if only the nature of its growth be understood. Farmers should be constantly on the alert to prevent weeds from becoming established on their farms. There are some general rules which all should remember:

1. Weeds do great harm, by robbing the soil of the plant food intended for the crop and also of its moisture.

2. Weeds crowd out and take the place of more useful plants, being hardier and, as a rule, more prolific.

3. Weeds are a source of great loss to farmers, as they require much attention, labour and time to eradicate, and frequently compel them to change the best rotation of their crops, or even perhaps to grow crops which are not the most advantageous.

4. All weeds bearing mature seeds should be burnt, and under no circumstances should they be ploughed under.

5. Weeds of all kinds can be eradicated by constant attention, and by adopting methods in accordance with their nature and habits of growth. Therefore—

(*a.*) Never allow them to seed:

(*b.*) Cultivate frequently, particularly early in the season, so as to destroy seedlings while still young and weak:

(*c.*) For shallow-rooted perennials, either trench the land deeply or plough so lightly that the roots are exposed to the sun and dry up; for deep-rooted perennials, the only means of destroying them is to prevent them from forming leaves, and thus storing up nourishment in their rootstocks to sustain future growth. This can be done by constant cultivation.

All weeds can be destroyed by the use of the ordinary implements of the farm, the plough, the cultivator, the spud and the hoe; but some experience is necessary to know what is the best time to work certain soils or to deal with special weeds. No general rules can be given, as the necessary treatment will vary in different districts, on different soils, and under different climatic conditions. What may be the proper treatment in one place may fail in another. Perennial plants, if allowed to develop flower stems and then ploughed down (or first mowed and then ploughed under) will, by the production of the flower stems, have so far reduced the nourishment stored up in the rootstocks that they are much weakened, and can afterwards be easily dealt with. On the other hand, it is found in the West that all the weeds and other plants decay readily if prairie land or meadows are broken in May or June. Land so treated can therefore be cleaned far more easily than if the operation of breaking is delayed until July. This is due to the climate and to the succulent nature of all parts of the plant at that season.

SEEDING DOWN.

The prevention of seed production is of great importance when clearing land of weeds. Many weeds may be held in check to a large extent, particularly upon land which is required for cropping, by seeding down to grass or clover, but, of course, any ripe seeds of weeds which are in the soil will germinate as soon as the land is broken up again. But in the same way that they crowd out crops and reduce the yield of seed, so may weeds themselves be choked out by more vigorous plants, which will prevent them from getting light and air, such as the free-growing grasses, millet, buckwheat, clovers, or even by a thickly-sown grain crop. This treatment will destroy the seedlings, which appear at the same time as the crop sown, and thus prevent them producing other seeds. When the land is ploughed again those seeds turned up near enough to the surface to germinate must be killed by the frequent use of the cultivator, harrow or weeder. An excellent plan of smothering out a restricted patch of any troublesome weed, frequently practised in the West, is to build a straw stack over the spot; a manure pile is used in the same way in the East.

Few farmers, of course, are acquainted with the scientific names, even in the case of our commonest weeds, but it would be well if they were; for certainly much confusion exists in different localities in the application of the English popular names, the same plant being frequently called by one name in one place and by quite a different one somewhere else, or quite as frequently a single name applied to a number of distinct plants in different places, or by different people in the same place. The advantage, or even necessity, of calling a plant by its proper name has been forcibly illustrated in the case of the tumbling mustard, now so prevalent in many parts of Manitoba and at Indian Head, &c., in the North-West Territories. This most injurious weed was for some time after its introduction spoken of generally as "tumble weed," a name properly belonging to a much less aggressive plant, the *Amarantus albus*, one of the pig-weeds. Owing to the use of this wrong name little effort was put forth by the settlers to destroy the new enemy, because it was well known all through the West that the true tumble weed was a native plant which had never given much trouble. Similarly the hare's ear mustard, a very noxious weed, was left undisturbed by some from having been wrongly spoken of by many as "black mustard." The black mustard, as a matter of fact, is of very rare occurrence in Canada, and, as far as I am aware, is not anywhere in the Dominion a troublesome weed in crops.

Use of Chemicals.

The efficacy of the use of chemicals for the destruction of weeds has so often been asked that I am prompted to give the following information. It will be observed that the expense is in most cases prohibitory:—

(Leaflet No. 63, Board of Horticulture of England.)

In 1897 attention was called to the possibility of getting rid of charlock (wild mustard) in corn crops by means of the application of certain solutions which, it was contended, could destroy the weed without injuring the cereal. During the past two seasons this method of dealing with the pest has been extensively tested in Great Britain, and, as a whole, the results have been successful. The substances chiefly tried have been copper sulphate and iron sulphate, and good results have been got from both. Although the former at present costs about 30s. per cwt., as against 4s. to 5s. in the case of the latter, the solution of iron sulphate must be used so much stronger than the other, that the difference in the cost of material is less per acre than would at first sight appear. Moreover, copper sulphate deteriorates less by keeping, is more easily manipulated, and does less injury to the clothes of the workmen.

Experience indicates that good results will, as a rule, be got by dressing an acre with, at most, 40 gallons of a 4 per cent. solution of copper sulphate, or with a similar quantity of a 15 per cent. solution of iron sulphate. To make the former, dissolve 16 lbs. of copper sulphate, costing about 4s. 6d., in 40 gallons of soft water; while, in the latter case, 60 lbs. of iron sulphate, costing about 2s. 6d., are required in a similar quantity of water. Somewhat better results will be got by dressing an acre with 16 lbs. of copper sulphate dissolved in 60 gallons of water, thus making a 2⅔ per cent. solution; but although this entails no extra outlay for material, it implies an increased expenditure on account of labour. Then, again, in place of applying 40 gallons per acre of a 4 per cent. solution at a single operation, superior results may sometimes be got by applying 30 to 40 gallons per acre of a 2 per cent. solution at a somewhat early stage of the growth of the weed, and a similar quantity ten days or a fortnight later. As compared with a single dressing, this involves no extra expenditure on material, but it entails the application of about twice as much water, and the crop suffers more from mechanical injury. Good results have occasionally been got with weaker solutions and with smaller quantities than those indicated, but, on the whole, those recommended above have proved most effective.

The quantities indicated have been found to do no permanent harm to cereals, or to clover or grass occupying the ground along with the corn crop, but solutions for application to beans or peas should be considerably weaker than those used for corn crops, or for tares.

A convenient method of procedure is to have two 40-gallon barrels in use, so that while the contents of one are being distributed the other may be used for the preparation of a fresh solution.

It may be noted that certain weeds closely allied to common charlock—especially wild radish, or white charlock, and smooth-leaved charlock—are not infrequently met with, and these do not readily yield to treatment. Other weeds, such as docks and thistles, are more or less crippled, without being destroyed, by the solutions.

To obtain the best results it is necessary to attend to the following points:—

1. The weed should not exceed three inches in height at the time of spraying, though fair success has sometimes attended treatment almost up to the time of flowering.

2. The solution must be made with clean and, if possible, soft water, and the vessels used in the process should be of wood.

3. The material, especially copper sulphate, should be bought under a guarantee of purity of 98 per cent. It should be obtained powdered, not in crystals. This facilitates solution.

4. The solution must be applied by means of a machine that generates a fine spray under air pressure. A hand machine of good construction will dress three or four acres in a day, while a horse machine will cover nearly ten times as much. The latter distributes the solution more thoroughly and equally,

5. Rain, immediately after spraying, will interfere with success, and the calmer the weather the more evenly and effectively is the solution distributed. Moderate dampness of the crop at the time of spraying is no disadvantage, and better results will be got in dull weather than in bright sun.

Mr. L. A. Dewey, Assistant in the United States Division of Botany, says, when speaking on the use of chemicals: "A few drops of carbolic acid applied at the base of the main stem with an ordinary machine oil-can is the best method that has, as yet, been devised for killing weeds with chemicals. But, on the whole, the use of chemicals as weed destroyers has not given much satisfaction, owing to their cost and the expense of applying them."

Professor F. T. Shutt, Chemist, Central Experimental Farm, in his report of 1900, gives the following information:—

WEED-KILLING COMPOUNDS.

Harvesta Chemical Compound—A Weed Destroyer.

This is a brownish-coloured fluid, made in New Orleans, La., and sold for the purpose of destroying weeds in gravel paths. It was analyzed at Dr. Fletcher's request. The mixture was neither caustic nor alkaline, and on analysis was found to contain arsenite of soda and common salt. These together amounted to 4.0 per cent., or 6.4 ounces per gallon, the common salt being 1.69 per cent., or 2.7 ounces per gallon. No doubt this is an effective weed exterminator, since both its constituents have long been known and used for this purpose. It is, perhaps, scarcely necessary to point out that such preparations should only be used on paths, or where it is desired to kill all vegetation.

For those who desire to prepare for themselves a weed-killing compound, we furnish the following receipts. The fluids are cheap and easily prepared, and have been used with good effect:—

1. To boiling water add common salt at the rate of 1 ℔. to 1 gallon. As soon as the salt is dissolved, and the liquid is still hot, apply it by means of a watering-can.

2. White arsenic, 1 ℔.; washing soda, 2 ℔s.; water, 3 gallons. Boil and dilute with from two to three times its volume of water. Apply while still warm in fine weather. This solution is highly poisonous.

3. Blue vitriol (bluestone), 2 ℔s.; water (hot), 6 gallons. Put the bluestone in a crock or wooden tub and pour on the water. Use while still hot.

4. Sulphuric acid, in the proportion of one part of acid to 1,000 of water, has also been effectively used where the soil does not contain any appreciable amount of carbonate of lime. If there is an effervescence when the acid solution is sprinkled on the path (showing the presence of carbonate), this preparation will be of no value.

5. Salt cake, or acid sulphate of soda, a by-product in the manufacture of muriatic acid, applied in solution (1 pound to 1 gallon), is very effective.

With respect to the use of any of the foregoing, it may be pointed out that thorough applications, especially at the beginning of the season, are to be advised, rather than lighter and more frequent doses. All these chemicals will do serious injury to soils intended for cultivation.

AGRICULTURAL SHOWS AND JUDGES.

The question of the arrangement of dates, the providing of competent judges, and the legitimate work of agricultural exhibitions, has long engaged the attention of this Department. Offers have been made suggesting that the arrangement of dates be left in the hands of the Department, with a view of adjusting the programme so that the dates would not clash, and by that means competent judges, which the Dominion and Provincial Governments and other bodies provide, would be able to judge at all the shows. Proper judges, who can give their reasons for their decisions, are unquestionably the main factors, from an educational point of view, in the use of agricultural exhibitions.

This is what " Farming World " says of this phase of the question :—

"The Selection of Judges at Fairs.

"Next to the exhibits themselves, the judging and awarding of the prizes is the most important feature of any great show. In many respects, a fair would have very little educational value were it not for the fact that experts select the meritorious exhibits and single them out for the visitor to examine and study. A fair does not exist alone for the purpose of dividing a certain amount of prize money among a certain number of exhibitors. It has an educational value that should not for a moment be lost sight of. The educational value of any show can be made or marred by the class of judges appointed to make the awards, and we are afraid that the managements of our larger fairs lose sight of this fact in making selections of suitable men. There is a tendency to cater more to the likes and dislikes of the exhibitor, in selecting judges, than to the effect their judgment will have upon the educational side of the show. Especially is this true of the selection of judges in many of the live stock departments, and very often a competent and experienced judge is set aside because of the whim, or otherwise, of some exhibitor. There was more than one instance of this kind which came under our notice at the recent Industrial Fair.

"While we believe that the wishes of the exhibitors should be consulted in a large degree, as far as practicable, in the selecting of judges, there is great danger in catering too much to their wishes. When this is done, the educational side of the show is very often sacrificed, and the visitor receives a wrong impression as to the type of animal best suited to the purposes for which it is intended. The effect of such erroneous impressions are very far-reaching indeed, and an observant visitor often returns home with entirely wrong ideals as to the types best adapted for commercial or other purposes.

"We are not reflecting at all upon the ability or honesty of any of the judges at our large fairs when we state that the time has come when the selecting of such judges should be placed upon a much higher plane than heretofore. Exhibition Associations should look more to the onlooker's side than to the exhibitor's side, and select judges whom they know are competent, reliable and above reproach. If they are not acceptable to the whim of some exhibitor, let the selection stand, so long as the authorities have faith in the judge's ability to give a thoroughly unbiased judgment. It sometimes happens that a position as a judge is given to some friend of the fair who has only a meagre knowledge of the classes he is judging, and whose judgment must work lasting injury to the community, in creating false ideals in the minds of persons who have come to the show to learn something about stock. In no case should anything like this be done. Merit and ability to give an honest and fair judgment should be the only qualifications looked for, whether there be one, two or three judges selected. Other things being equal, we believe that a thoroughly competent and reliable single judge will give better all-round satisfaction than two or more judges.

"Looking at this question from the exhibitor's point of view, we believe he will be better satisfied if the educational side is considered in the selection of judges than otherwise. No reputable breeder or exhibitor will hesitate to submit his stock, of whatever kind, to the decision of a thoroughly reliable and trustworthy judge. It is the fellow who has some inferior stock, that he knows will not be in the prize list unless he has some hold on the judge, that will raise the kick. And it would be better to let him 'kick' rather than sacrifice the first object of a show to his whim. Where a thoroughly competent judge is selected, who will do the right thing without favour to any, his judgment should be of as great educational value to the exhibitor as to the onlooker, in that it will show him wherein his animal is lacking and the winner excels.

"The selection of judges, then, looked at from both the exhibitor's and the onlooker's standpoint, is a most important problem, that should receive more attention than it gets at the hands of Exhibition Associations. There should be no catering to any special interest whatsoever, but an upright and above-board selection, looking to the effect the awards will have on the bearing or best working of the industry represented. We do not say that the selections for this season's fairs have not all been of the kind we have indicated, but we have good reasons to know that some of them have not. Let there be, then, an effort made to have every judge selected on the higher plane we have pointed out, that of looking altogether to the educational value of the show."

The "Vancouver World," in an article on the Melbourne Fair, in Australia, makes the following remarks:—

"An innovation was introduced by the judge on sheep, who sent in written reasons for making his awards. These were read at the annual dinner of the society and proved interesting and very instructive. This might be done in various lines, and if there could be some arrangement made at our exhibitions in this Province whereby the public, when examining the exhibits, could have before them the reason why an article was awarded first, second or third place, etc., it would prove very useful as an educator. This would necessitate the securing of competent judges in every department, so that the public might place implicit confidence in the decisions."

As regards the legitimate work of fairs, too much attention and prominence, in the opinion of very many, is given to side-shows, such as games, baloon ascensions, etc., detracting attention from the main object of an agricultural and industrial fair. The following articles deal with this view of the subject in a clear and concise manner:—

Fairs and "Attractions."

(*From the Haverhill, Mass., Gazette.*)

"A Boston committee recently investigated the matter of fairs, and addressed letters to a number of State secretaries of agriculture asking whether, in their opinion, the purely legitimate or 'wide-open' agricultural fair pays best in the end, financially, socially or educationally? The replies received from fifteen of the secretaries indicate that evidence is in favour of the purely legitimate fair. It has to be conceded, of course, that, educationally and socially, the 'wide-open' institution is not a success, but it has been argued by many that in order to draw the crowd which is necessary for the financial support of the other features of the fair, it is necessary to have the 'wide-open' accompaniment—in fact, that these side-shows are necessary for the success of the big show, an argument which is maintained even when the side-show becomes the real thing and the big show is relegated to a position of no importance. There has been very much of the same idea in the planning and management of the greater exhibitions of national importance, where the 'Midway' has been considered an essential, because of its supposed drawing powers, which the exhibits of the arts and sciences have not been credited with possessing. Now, the managers of the Buffalo Pan-American have demonstrated some degree of independence of these 'Midway' people, and forced them to a realisation of the fact that they are in reality but a side-show, and the management of the St. Louis Exposition have gone a step farther, deciding to do without the 'Midway' features altogether. The agricultural managers, on their minor scale, have evidently come to the same conclusion, for the consensus of the replies of the State officials referred to, is said to be given in the reply of Secretary True, of Wisconsin, who says: 'Temporary financial advantage may be gained by ignoring the educational and social features of the fair and admitting questionable attractions, but in the long run only the clean fair will succeed, financially or otherwise.' And the others are uniformly of this opinion. Secretary Bell, of Vermont, says: 'The most successful fair in Vermont is purely agricultural, no side-shows or games of chance, and draws the crowd every season.'

"The management of our own Essex County fairs have always held strictly to this theory of fair management, and have maintained in its annual appearance the prominence of the agricultural interest, and while they have from time to time introduced popular features in the show, they have not suffered anything to be countenanced which would lower the tone of the exhibition or that would have a tendency to detract from the original purpose of this institution. In a recent appeal, indirectly issued, the belief is expressed that 'the farmers of Essex County, who have a very vital interest in the society, on considerations affecting the past, present and future, can materially aid this year by taking an unusual interest in the coming fair, by preparing for larger exhibits than they have made before, and by letting it become known that they are making such preparations, and that the agricultural exhibit, with their co-operation, will be the largest of years.' It cannot be denied that the members of the society have kept the interests of the farmers at heart, and that their efforts have borne fruit, and the response to the appeal should be a general and generous one."

Adverting to the Melbourne show referred to previously, the "World" goes on to say regarding the people who attended it:—

"They went, says the 'Australasian,' to see the show, to admire the live stock, the machinery and implements, and the thousand and one other things that went to make up a fine educational exhibition; they did not go because they were attracted by the catch-penny business which some people seem to think is indispensable in connection with agricultural shows now-a-days. This speaks well for the people of Melbourne and the country surrounding, and it is doubtful whether those of many parts of Canada could be induced to take much interest in a large agricultural fair from educational motives solely. The vital question with the managers of large fairs in the Eastern Provinces seems to be, what attractions must we offer in order to ensure the largest attendance possible? The consequence is that the people have become so accustomed to see circuses, horse-racing, sham-battles, fireworks and other attractions that, if these were not advertised in connection with a large exhibition, the management would find their treasury empty, owing to the small attendance. Every year something new has to be advertised in the way of amusements, and the directors have been in many cases forced to submit to a 'much wants more' policy on the part of the people, until they are almost at their wits' end as to how far this will go. The great aim should be to make an exhibition pre-eminently an educational institution, which we are sorry to say in many places it is not—at least, the majority of those who attend do not look upon it in that light."

SOME PROVINCIAL BREEDERS OF LIVE STOCK.

HORNED CATTLE.

A. C. Wells & Sons, Sardis	Ayrshires and Jerseys.
John Sampson, Chilliwhack	Shorthorns, Durhams and Ayrshires.
J. A. Evans, 〃	Durhams.
G. W. Chadsey, 〃	Holsteins.
J. Reece, 〃	〃
J. Pelly, 〃	Jerseys.
A. J. Street, 〃	〃
M. F. Gillanders, Cheam	Durhams.
R. Balfour, Langley	Jerseys (pure).
Thos. Sincock, 〃	〃 (grade).
John Jelly, 〃	〃 〃
W. R. Robb, Comox	Shorthorns.
Jos. McPhee, Courtenay	〃
S. J. Piercy, Sandwick	〃
Thos. Williams, Comox	〃
Alex. Urquhart, Courtenay	Jerseys.
Wm. Lewis, 〃	〃
Duncan Bros., Sandwick	〃
Thos. Cairns, Comox	〃
Byrne Crawford, Courtenay	Holsteins.
Wm. Mackie, Agassiz	Ayrshires.
G. W. Beebe, 〃	Guernseys.
T. W. Stirling, Kelowna	Ayrshires and Jerseys.
W. Barlee, 〃	Jerseys.
T. Mawhinney, 〃	〃
Shannon Bros., Cloverdale	〃
Geo. Deans, Victoria	Shorthorns.
Geo. Sangster, Sidney	〃
G. Bradley Dyne, 〃	〃
S. Fairclough, 〃	〃
F. Turgoose, Turgoose	〃
Haldon Bros., 〃	Polled Angus.
W. Newlands, Eburne	Holsteins.
W. H. Ladner, Ladner	Shorthorns.
W. H. Le Poer Trench, North Saanich	〃
Jas. Bryce, 〃	〃
J. D. Pemberton, Victoria	〃
J. W. Tolmie, 〃	〃
J. A. Sayward, 〃	〃
Watson Clark, Oakland	〃
W. J. McKeon, Mt. Tolmie	〃

SWINE.

A. C. Wells & Sons, Sardis	Berkshires.
Geo. E. Banford, Chilliwack	Poland Chinas.
John Sampson, 〃	Berkshires.
Jos. Thompson, 〃	Chester Whites.
H. Kipp, 〃	Berkshires.

Wm, McAdam, Port Hammond	Berkshires.
Alex. Urquhart, Courtenay	〃
Jos. McPhee, 〃	〃
Thos. Cairns, Comox	〃
Wm. Mackie, Agassiz	〃
G. W. Beebe, 〃	Tamworths.
Shannon Bros., Cloverdale	Berkshires.
J. T. Wilkinson, Chilliwack	〃
A. G. Wrigley, South Saanich	〃
Geo. Sangster, North Saanich	Chester Whites.
G. Sturdy, Saanich	Suffolks.

HORSES.

J. T. Wilkinson, Chilliwack	Roadsters.
J. A. Evans, 〃	Clydesdales.
J. M. Steves, Steveston	Suffolk Punch.

GOATS.

G. W. Beebe, Agassiz	Angoras.

SHEEP.

J. T. Wilkinson, Chilliwack	Southdowns.
John Sampson, 〃	Dorsets.
Geo. Underwood, Langley	Leicesters.
G. W. Beebe, Agassiz	〃
Shannon Bros., Cloverdale	Oxfords.
J. S. Shopland, Maywood	Southdowns.
H. W. Bullock, Ganges, Salt Spring Island	Shropshires.
John Richardson, Prevost Island	〃
Frank Kirkland, Westham Island	〃
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Jno. Richardson, Prevost Island	Oxford Downs.

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A. C. Wells & Sons, Sardis	White Plymouth Rocks, White Pekin Ducks, White Embden Geese.
W. Barclay, Central Park	Dorkings.
A. G. Cook, 〃	Black Langshans.
J. C. Dixon, 〃	Game and Game Bantams.
D. O. Patterson. 〃	Brown Leghorns.
W. Maxwell Smith, 〃	Barred Rocks.
C. S. Hayes & Co., Cedar Cottage	White Wyandottes, White Rocks, White Minorcas, White Indian Game, Buff Leghorns.
C. R. Monk, Vancouver	Black Minorcas.
E. Trimble, 〃	Light and Dark Brahmas, Black Minorcas.
C. J. Horling, 〃	Barred Rocks.
W. T. Lindsay, 〃	Barred Rocks, Langshans, Cochins.
G. F. Pound, 〃	Light Brahmas.
J. Rumble, 〃	Barred Rocks.
V. Raine, 〃	White Rocks.
T. S. Smith, 〃	Cornish, Indian Game.
W. Towler, 〃	White Leghorns, Brown Leghorns, Barred Rocks, Black Minorcas.
S. Tallman, 〃	Buff Rocks.
E. Phillip, Grantham	Minorcas.
W. S. Beckett, 〃	〃
Jno. B. Blackburn, 〃	〃

J. A. Halliday, Sandwick	Silver Laced Wyandottes.
W. Bowler, Courtenay	″ ″
Wm. Mackie, Agassiz	Barred Plymouth Rocks.
G. W. Beebe. ″	″ ″
Mrs. Jemmett, ″	Light Brahmas.
Mrs. Curby, ″	White Wyandottes.
Jas. Morrow, ″	Barred Plymouth Rocks.
H. Lysons, Kelowna	White Wyandottes, Golden Pheasants, English Pheasants.
Shannon Bros., Cloverdale	Toulouse Geese.
C. A. Carncross, Surrey Centre	Light Brahmas.
Wm. Stewart, Eburne	Silver Laced Wyandottes, Pekin Ducks.
Thos. Mackie	Barred Plymouth Rocks.
Wm. Towler, Mount Pleasant	A variety.
M. J. Henry, Vancouver	White Plymouth Rocks.
Mrs. J. Stewart, Bank of Commerce, Nanaimo	A variety of highly bred fowls.

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ERRATA.

Page 93—For *Gantheria Shallon* read *Gaultheria Shallon*.
" 53—Correspondent's name is Bown, not Brown.

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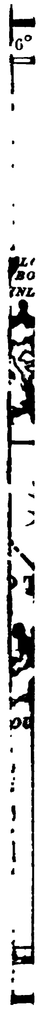
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